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An analysis of production-related key figures in the Norwegian fishing fleet 1975-1980

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REPORT: An analysis of Production-related key figures in the Norwegian Fishing Fleet 1975-80

AUTHOR: Hans Erstad

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EXTRACT:

The report demonstrates how the capital and labor factors are distributed in the different branches of Norwegian fishery. It is also shown how the conditions between the two factors (the capital intensity) have developed in the second half of the seventies.

The report also shows how the productivity in the fishery has developed. The productivity was measured as catches, or processed value per man-week, distributed by type of vessel and year. The same was done for the value created by a vessel, as a percentage of the capital invested in the vessel, in order to demonstrate how the capital was utilized.

In order to obtain individual results, comparisons were made with corresponding figures from the industry. The calculations in the report are based on financial statements

of the Budget Committee for the fishing industry.

AN ANALYSIS OF PRODUCTION-RELATED KEY FIGURES IN THE NORWEGIAN FISHING FLEET, 1975-80

By Hans Erstad

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SUMMARY.

The report is based on financial statements of the Budget Committee for the fishing industry, in the period 1975-80 for vessels over 40 feet (13 meters). The report presents certain production-related key figures, which have been calculated on the basis of work prepared from financial data, and the calculations by the Budget Committee of the replacement costs of vessels.

Stress has been laid on investigating whether there are differences between the various forms of operations and how these have developed over the period. Comparisons have also been made with corresponding figures for the industry.

Most of the fishing groups have had an increase in standards in the period, measured in terms of the replacement costs of the capital assets in fixed prices. It is difficult, however, to determine this exactly. The vessels in the factory trawler fleet have an average capital value of approximately 26 million 1978-kroner in 1980. The smallest group of vessels in the analysis (the coastal fleet) has a corresponding value of well over 1 million kroner. The number of men onboard (man years) per vessel varies from 2 in the coastal shrimp fleet to 33-36 in the factory trawler fleet. The number of man-weeks worked in the individual vessels the year varies from approximately 80 (coastal shrimp trawlers) to over 1500 (factory trawlers in 1975). A small reduction in the number of men simultaneously onboard a vessel took place in individual groups in this period, but this is not an unambiguous trend.

The fishing fleet appears to be more capital-intensive

than the average for the industry. However, a large variation is to be found in this result, since the measure of capital intensity varies much between the different fishing groups, with ring net, industrial trawl and fresh fish trawl as the most capital-intensive groups.

The strong variations in the resource base make it very difficult to measure the development of the productivity in the fishing fleet and for the individual groups. All the same, it seem that the productivity measured by quantity of catch per man-week has increased for most of the groups in the period.

The value created (processing value) per man-week is greatest for the ring net vessels and vessels trawling for cod. This involves a value of around 10.000 kroner per man-week, including a price subsidy.

Calculations of the created value, exclusive of average price subsidies, show that the productivity per employee nevertheless is higher than the average for the industry, even if we take account of the fact that a man-year in the fisheries involves more than one employee (Probably between 1 to 1.5 employees per man-year).

Utilization of capital assets, measured by the value created (processing value) as a percentage of the replacement value of the assets, also varies considerably between the different fishing groups. The greatest utilization has been by salt fish trawlers, the bank fishing fleet, and the coastal fishing fleet with a percentage in excess of 30 in 1980.

In the last part of the period, i.e. the years 1978-80, utilization in the industry has nevertheless been better on average. Sections of the industry which produce finished goods are largely better off than the fishing fleet.

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AN ANALYSIS OF PRODUCTION-RELATED KEY FIGURES IN THE NORWEGIAN FISHING FLEET 1975 - 1980.

by

HANS ERSTAD

(In Fiskeriteknologisk Forskningsinstitutt Rapp. Projectnummer 664.1.3. 1983.)

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1. INTRODUCTION

The aim of this report is to show how productivity in the Norwegian fishing fleet has developed in recent years, and particularly the period 1975-1980.

The data base for the calculations is the financial statement of the Budget Committee for the Fishing Industry for vessels of 13 meters length over all (l.o.a.) and above (previously 40 feet and above at the waterline).

The financial statement shows figures of value. In order to obtain comparable figures for all the years, we deflated all values (if not otherwise stated) to 1978 NKr. The price indexes used were calculated based on average prices from Fishery Statistics and differentiated according to type of operation. In addition, the wholesale price index, wage statistics and other official statistics were used in the deflation calculations.

In this report we will look at production conditions for various types of operations (10 operational groups) at vessel level.

The whole post-war period has been characterized by a strong rationalization of the fishing process. The number of fishermen has declined and the vessels have become larger and more efficient. In the fishing gear sector, artificial fibres

have taken over as material for fabrication of much of the gear. In addition, the gear, through mechanization and improved efficiency, has changed character and size when compared to only a few years ago.

The vessels have, to a great degree, been built or rebuilt specifically for a particular fishery (for instance, stern trawlers and purse seiners. The vessels are also better equipped. Great use is being made of hydraulics in large as well as small vessels with regard to deck machinery and gear handling. Electronic fish finding equipment and navigational equipment have also undergone an enormous development and improvement. There are now also various types of fish handling equipment on board in some sectors of the fishing fleet, though the development in this field is still only in its infancy.

6.

Of course, such a development has cost something. Primarily, the increase in catching efficiency has led to great changes in the resource base. Fish stock after fish stock has, in recent years, been in danger of being more or less depleted so that there has been a need for increasingly more comprehensive regulations to prevent over-fishing of the stocks.

For individual fishing boat owners, the need for steadily greater efficiency has made the vessels more and more expensive, with the consequent increasing need for greater catches to cover the capital investment. Together with limited

catch quotas, this has created new problems and led to various subsidy arrangements and other regulations such as lay-up orders and condemnation of vessels.

The report will take a look at certain central coefficients which indicate the development of the capital investment, measured in replacement value, and how catch and value creation change in relation to the value of the capital and the labour input.

7.

2. DATA MATERIAL

The data base for the calculations was financial statements from "Budget Committee for the Fishing Industry". Each year the Budget Committee collects statements from year-round operating fishing vessels for the calculation of the earning capacity of the Norwegian fisheries. We used this material from the so-called large vessels, over 13 metres l.o.a.. The reason we looked at the period after 1975 only, is because in that year the Committee changed the basis for its calculations of replacement value of capital invested in vessels and equipment.

The Budget Committee does its own calculations as to what an equivalent vessel with similar equipment would cost. The Committee bases this on information collected from shipyards, engine manufacturers and suppliers of equipment to

the fishing fleet. This, together with information from the fishermen about their vessels and equipment, was used to calculate the replacement value of each vessel included in the study. That was done for each year, using current prices. The Budget Committee used the vessel's replacement value for the calculation of annual depreciation of the vessel.

By utilizing the Budget Committee's replacement values we had consistent information about the real capital in nominal prices for any period for the sampled qroups. On the basis of the wholesale price index, the values were deflated to fixed 1978 Norwegian Kroner.

The Budget Committee calculated separate replacement values for hull, engine, hydraulic, electronic, and factory equipment.

With regard to the amount of fishing gear, the condition here is that many fisheries experience such hard wear and tear on their gear that it must be changed and maintained continuously. The Budget Committee has taken this into consideration and now carries the expenses for fishing gear as an annual operating expense for all types of gear except seines.

8.

Therefore, in the production calculations discussed in Chapter 6, gear capital has not been included. However, since the value of the amount of gear for many fisheries today is of significant

magnitude, a closer look was also taken at the values invested in gear for the various fisheries in relation to the value of the vessel.

The 10 operational groups covered by the report represent a cross-section of the Norwegian fishing fleet over 13 meters (40 feet).

The groups follow the groupings used by the Budget Committee and is approximately homogeneous for the whole period.

In the following, the composition of the groups is further described:

1. Coastal cod fishing fleet..
   Forty to 69-foot net, jigging, Scottish seining and long lining vessels. There may also be combinations with other gear.

2. The Banks Fleet
   Mainly longliners but also net vessels of 60 feet and over. Often in combination with other gear. The groups fish for dogfish, ling, cusk, halibut, Greenland halibut, cod and other cod species.

3. Coalfish seiner fleet.
   Vessels of 40 feet and over. Often other fishing for brief periods of the year.

4. Fresh fish trawler fleet

Trawlers of 200 GRT and more. Fishing for cod and other cod species which are delivered fresh or round frozen.

5. Salt fish trawler fleet

Trawlers of 200 GRT and more. Fishing for cod and other cod species which are mainly delivered salted.

9.

6. Factory trawler fleet.

Trawlers of 200 GRT or more. Fishing for cod or cod-type fish which is mainly delivered as frozen filets.

7. Industrial trawler fleet.

Trawlers of 50 feet or more. Fishing for Norway pout and sand eel, capelin and other species. May also be combined with other fishing for short periods of the year.

8. Purse seiner fleet.

Trawlers of 90 feet or more. Fishing for herring, capelin, mackerel and ocean fishing for sprat. Also in combination with hake trawling and other gear for brief periods of the year.

9. Coastal shrimp trawler fleet.

Vessels under 50 GRT. This group is pure, that is, no combination with other operations.

10. Ocean shrimp trawler fleet.

Vessels of 50 GRT and more. With and without freezer plant. May be in combination with other fishing.

Table 1 shows how the sampled vessels were distributed over these ten groups for the period studied. The number of vessels in the groups was, as shown in the table, kept relatively constant, with the exception of ocean shrimp trawlers where there was an increase during the period.

10.

TABLE 1.

Number of vessels in the sample, distributed according to groups of gear and year. (Source: Budget Committee for the Fishing Industry).

	1975	1976	1977	1978	1979	1980
COASTAL FISHERY	143	139	125	138	125	150
BANKS FISHERY	38	43	33	38	35	43
COALFISH SEINING	43	31	40	47	30	42
FRESH FISH TRAWLING	56	55	33	34	42	42
SALT FISH TRAWLING	-	-	4	2	7	6
FACTORY TRAWLING	6	8	5	11	5	11
INDUSTRY TRAWLING	77	77	66	56	48	43
PURSE SEINING	71	76	66	82	70	62
COASTAL SHRIMP TRAWLING	63	76	78	65	65	94
OCEAN SHRIMP TRAWLING	19	16	16	28	37	43
TOTAL	496	521	466	501	464	536

3. CAPITAL FACTOR

3.1. Basis for the capital value.

This chapter deals with the value of vessels in their individual operational groups. It is often difficult, in practice, to determine the value in relation to the ideal and fundamental definitions of capital value.

What is interesting to look at is what values the vessels represent for the period we were studying. There are two ways of looking at it:

a) What is the re-sale value of the vessel?

b) What would the vessel cost if exactly the same vessel were built today (during the period studied)?

We will look at both, but with the main emphasis on replacement value because this provides a better view of changes (new investments) during this period. It will also be better suited for comparisons across operational groups having vessels and equipment of various ages. For each year, the Budget Committee calculated the replacement value of each vessel as a write-off basis in its examinations of profitability in the fleet.

In calculating the replacement value of vessels, the Budget Committee starts with the various main components of the

vessel: hull, engine, electronic equipment, hydraulic equipment and factory equipment. This was done because the mix of the components varies from vessel to vessel.

When calculating the current replacement value of a hull, the Budget Committee considers the size of the vessel. Based on information from boat builders, a functional relationship between building price and vessel length was worked out for each year. Consideration was also given to changes in building material prices and other cost components, wage developments in engineering workshops, changes in public fees, etc., and construction prices for realized building projects.

12.

It is obvious that a year with little new construction causes the structuring of such a replacement value to be more uncertain than when there is a year with great activity against which to adjust calculations. When construction is slow several years in a row, as it was at the end of the period studied, it is obvious that it is difficult to calculate realistic replacement values. The uncertainty is particularly great for large vessels because extremely little new construction has taken place here.

Engines and the various equipment components are more likely to show more reliable replacement values. The Budget Committee collects detailed information on what type of components are on board and the make of the engine or equipment components.

Based on current component prices from engine and equipment manufacturers, the replacement value is then determined. The uncertainty in this area occurs because of the rapid developments, particularly in electronics, which may quickly make the equipment obsolete. Relatively new equipment may also no longer be produced and be replaced by new advanced and more suitable equipment.

The replacement values calculated by the Budget Committee are therefore based on comprehensive material, including information about the individual vessel and from ship builders and manufacturers of engines and equipment. The vessels in the study were thus looked at individually so that, despite any uncertainty, this formed a good basis for the value of the fleet, measured in what it would cost to build now. Therefore, in the following calculations, we will use the calculated replacement values as they appeared in the material from the Budget Committee.

One problem that must be considered is the sharp price increase which took place during the period. To obtain any comparable figures for all the years, we constructed a price index based on the wholesale price index and wage developments in engineering workshops using 1979 as the base year, to deflate the values. Appendix 1 explains this price index.

3.2 Developments in replacement values of vessels.

There is a great difference in the capital locked in to vessels from various operational groups, when capital is measured in replacement value. Some of the differences are, of course, due to differences in vessel size between the groups, but far from all can be explained that way.

In Figure 1 we have presented average replacement values for three years for the various operational groups and how the values were distributed over the three main parts, hull, engine and equipment. Electronic, hydraulic and fish handling equipment were included in the equipment column. The average figures for the replacement value for all years are given in Table 2 while Tables 1-3 in the Table Appendix show the same for the three main components.

Based on replacement cost information, the fishing fleet over 40 feet was roughly divided into three groups where, of course, there may have been individual variations, particularly according to vessel size, but where, nevertheless, the difference in level between the three groups was pronounced. 15.

The first group contained only factory trawlers. An average factory trawler is a fishing vessel of a special class, which represents the most capital in the Norwegian fishing fleet with an average of 25-29 mill. 1978-NKr. for the period studied. The replacement values of both hull and equipment were

considerably above that for other vessels, while the engine, at the end of the period, was not above the average replacement value of engines in in the purse seine fleet. The reason the hull value was so high was due to conditions such as the interior lay-out for 40-45-man crews and space for a large factory plant. The factory plant, with fully insulated freezer space and freezer plant, drove the value of the equipment up.

The real value of engines decreased over the period. This was because the few factory trawlers newly-built during the period were considerably smaller than those taken out of

TABLE 2

Average replacement value of Norwegian fishing vessel distributed by fishery and year. Fixed 1978 prices.

	1975	1976	1977	1978	1979	1980
COASTAL FISHERY	873.400	945.400	1019.700	1081.600	1358.100	1278.000
BANKS FISHERY	2550.600	2721.700	4238.500	5297.100	6567.300	6112.900
COALFISH SEINING	1226.600	1370.800	1721.100	1905.500	2491.800	2649.200
FRESH FISH TRAWLING	13269.200	12892.500	12625.200	15640.400	14954.300	14154.300
SALT FISH TRAWLING	-	-	16504.600	*	15499.400	16821.300
FACTORY TRAWLING	28116.800	26960.500	29029.300	27618.200	26532.400	25612.000
INDUSTRY TRAWLING	2567.600	2718.700	3610.700	4186.400	5782.000	5907.900
PURSE SEINING	8469.300	10164.100	12524.200	15068.400	15374.100	15437.700
COASTAL SHRIMP TRAWLING	754.800	871.300	921.400	1015.100	1195.500	1221.400
OCEAN SHRIMP TRAWLING	4098.000	5720.400	7988.600	6349.300	6576.100	6247.300

- No observations
* Figures not available

Figure 1 Replacement value of hulls, engines and equipment in the Norwegian fishing fleet. 1978 Kroner.

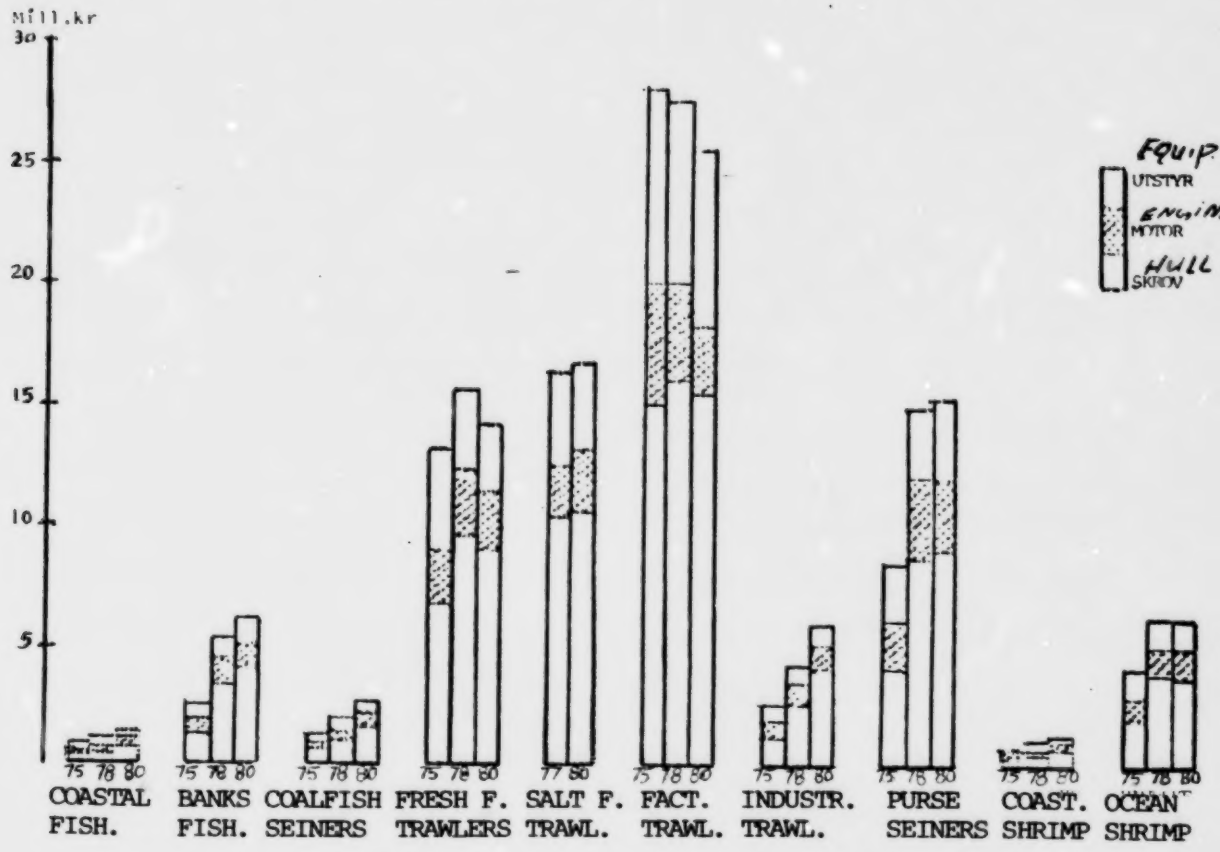
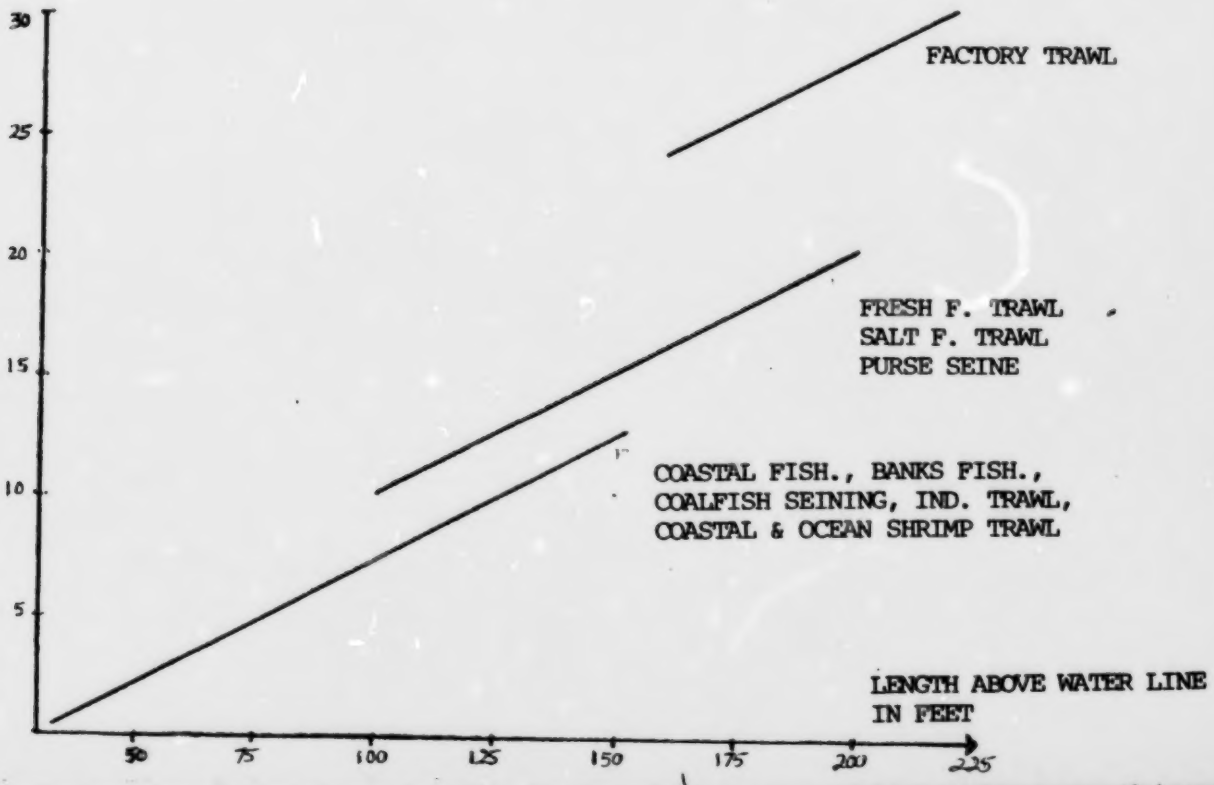


Figure 2. Average co-variation between vessel value (excluding gear) and length of vessel. Regression relationship for 1980.



the fleet. Figure 2 shows that the decrease in engine value also showed up because the average replacement cost for the total groups decreased over the period.

The other group was an in-between group which included fresh fish trawlers, salt fish trawlers and purse seine vessels. An average vessel among these has a total replacement value of 14 - 17 mill. 1978 NKr at the end of the period. While the trawlers remained on this level during the whole period, the average for purse seiners showed a development throughout the period. This was the average figure, so we are likely to find individual vessels, particularly in the purse seine fleet, which lie close to the replacement value of factory trawlers. This applies to large vessels with heavy engines and expensive electronic equipment and equipped for hake trawling.

The last group consists mainly of the smallest vessels with the main emphasis on those under 100 feet, but also includes vessels up to 150 feet. The group includes the remainder of the fishing groups in Table 2. It is evident that the average total replacement value varies somewhat from about 1 mill. NKr. for coastal shrimp trawlers and conventional coastal fishing vessels to about 6 mill. for ocean shrimp trawlers and bank fisheries. This difference is, however, mainly caused by differences in vessel size from group to group.

16.

To provide an illustration of the difference between

the averages in these groups, we used, with aid of the least squares method, a multiple linear regression of replacement value in relation to fiscal year, vessel length in feet and which of the three groups the vessel belonged to. The result for 1980 is shown in a coordinate system and presented in Figure 2.

The information shown in Table 2 is the average for each year. The developments we observed based on this may, therefore, have been due to changes in average vessel size in the fisheries groups. The development, therefore, does not necessarily represent a real increase in standards for a vessel of a given size for the period covered. Attempts were made to eliminate this by calculating the average development, distributed according to size. The results are shown in Tables 3-13 in the Table Appendix.

In the following Tables 3 and 4, we have compiled the changes from 1975 to 1980 (absolute and relative) from Tables 4 - 13 in the Table Appendix to show how changes in replacement value for the period vary from fishery to fishery and by vessel size.

The information in Table 3 indicates that the changes in replacement value vary greatly, depending on vessel size. Changes in average replacement value for the period were, for the smallest group size, at about 400,000 NKr (1978 NKr.), while the changes for the largest banks and industrial

TABLE 3

Changes in average replacement value of Norwegian fishing vessels from 1975 to 1980, distributed by fishery and vessel size (10-foot groups). Fixed 1978 prices.

		COASTAL FISHERIES	BANKS FISHERIES	COAL FISH SEINING	INDUSTRIAL TRAWL	COASTAL SHRIMP TRAWL
40-49.9 feet	1000 NKr.	406,2		442,3		358,4
	% change	55,8 %		52,4 %		50,0 %
50-59.9 feet	1000 NKr	643,1		779,6	587,5	710,8
	% change	61,9 %		69,8 %	50,2 %	76,3 %
60-69.9 feet	1000 NKr.	1083,4	1484,8	1343,2	1178,4	
	% change	78,1 %	94,9 %	96,1 %	81,1 %	
70-79.9 feet	1000 NKr.		2235,4	2731,0	2254,8	
	% change		108,4 %	92,1 %	99,1 %	
80-89.9. feet	1000 NKr.		2949,9		2384,0	
	% change		116,9 %		77,7 %	
90-99.9 feet	1000 NKr.		3456,8		2798,1	
	% change		100,9 %		78,4 %	
100-109.9 feet	1000 NKr.		4009,4 *)		2793,9	
	% change		108,0 %		61,9 %	
110-119.9 feet	1000 NKr				3903,5	
	% change				80,0 %	
TOTAL AVERAGE	1000 NKr.	404,6	3562,3	1422,6	3340,3	466,6
	% change	46,3 %	139,7 %	116,0 %	130,1 %	64,8 %

.....

* over 100 feet

TABLE 4.

Changes in average replacement value of Norwegian fishing vessels for the whole period 1975-80 distributed by fishery and vessel size (20-foot groups). Fixed 1978 prices.

		FRESH FISH TRAWLERS	FACTORY TRAWLERS	PURSE SEINERS	OCEAN SHRIMP TRAWLERS
60-79.9 feet	1000 NKr.				1887,7
	% change				108,8 %
80-99.9 feet	1000 NKr				3119,9
	% change				98,0 %
100-119.9 feet	1000 NKr.				3729,5
	% change				66,5 %
120-139.9 feet	1000 NKr.	489,0		5119,7	8822,9
	% change	3,8 %		71,5 %	168,7 %
140-159.9 feet	1000 NKr.	130,9		6664,4	
	% change	0,9 %		71,0 %	
160-179.9 feet	1000 NKr.			6031,1	
	% change			48,4 %	
180-199.9 feet	1000 NKr.		-544,5*)	5397,4**)	
	% change		-2,2 %	37,5 %	
200 feet and over	1000 NKr		-2760,2		
	% change		-8,9 %		
TOTAL AVERAGE	1000 NKr.	885,1	-2504,8	6968,4	2149,3
	% change	6,7 %	-8,9 %	82,3 %	52,5 %

* less than 200 feet

** 180 feet and over

trawlers were at 4 million Kroner. This development of replacement value is in fixed prices and therefore gives an expression of a real increase and thereby provides an indication of investments over the course of 5 years (from 1975 to 1980). Of course, this result only applies on condition that the replacement values are realistic and that the price index used in the deflation expresses the real price increase during the period covered.

17.

In Table 4 the largest vessel groups are shown in 20-foot groups. For the rest, the content of Table 4 is similar to the information given in Table 3.

The results shown in Table 4 indicate a less uniform picture than shown in Table 3. The fresh fish trawler group, where the vessels were built according to the series principle and with strong price competition, experienced a more-or-less standstill in replacement value, while factory trawlers showed a clear decline in the replacement value of the vessels. Purse seiners showed a strong increase which appears to be unrelated to vessel size while ocean shrimp trawlers appear to have a more natural increase compared to the groups in Table 3, with one important exception - the group 120-139.9 feet, which showed an increase of 8.8 mill. NKr. for the period studied. The latter figure is due to the fact that, while rebuilt whaling ships dominated this group earlier, it is now the more specialized new factory trawlers with modern equipment and freezer plants on board which predominate.

Tables 3 and 4 are instructive insofar as they provide expressions of changes which occurred from 1975 to 1980 and how the changes were distributed over the fleet. Nevertheless, the tables have two particular weaknesses so that the absolute figures in the tables must be used with caution. It is, however, likely that both the size and distribution of changes provide a good impression of changes in the material used.

The weaknesses which must be kept in mind are, primarily, that even with such a division into size groups, there may, within each group, easily have occurred a change in the average size of vessels in the group. This was particularly evident in Table 4 with the 20-foot groups. Therefore, the figures are not completely comparable in the first and last years, and some of the changes are due to changes in average vessel size.

Another thing is that the table only dealt with the difference between the average in the two perimeter years (1975 and 1980). In other words, the developments which actually took place in the middle years were not included. For instance, tables 4-13, in the Table Appendix, indicate that many of the size groups show a reduction in replacement value of vessels from 1979 to 1980. This means that if the difference between 1975 and 1979 were included then the changes would actually have been greater over a shorter period of time than indicated by Tables 3 and 4.

To compensate for these weaknesses, a multiple

regression was carried out for each individual fishery. These regressions consider the special developments and relationships which lie within the individual fishery in contrast to the regression which was used for Figure 2, where the results showed the same development for all the groups with a parallel displacement between the level for the three groups. The adaptation for regression as a whole was better but, nevertheless, individual information was lost.

The natural logarithm for replacement value was used as a dependent factor with the fiscal year and length above water line as explanatory factors in a linear regression. In this manner, a replacement value was obtained (without logarithm) as an exponential function of year and length, that is, that the coefficient for the fiscal year would be the same as the annual growth rate for the period covered. The annual growth in absolute value was therefore greater at the end of the period than at the beginning. Since this is also an unbroken growth function, there was no decline such as can occasionally be observed in the tables showing the average (e.g. Tables 4-13 in the Table Appendix). The regression was, nevertheless, an average regression where it was considered that growth in the first years was less than that we directly observed. In other words, we have an average growth for the whole period studied.

20.

Obviously, not even this method of determining real growth in vessel standards for vessels of a given size is

without fault. Nevertheless, we believe that such a regression helps fill in the picture which is presented by the results shown in Tables 3 and 4.

TABLE 5.

Regression calculations for replacement value in fixed 1978 prices of vessels as function of vessel length and fiscal year for various main groups in Norwegian fisheries during the period 1975-80.

Fishery	n	r^2	a_1	a_2
COASTAL FISHERY	820	0,84	0,047	0,095
BANKS FISHERY	230	0,92	0,025	0,164
COALFISH SEINING	233	0,92	0,037	0,116
FRESH FISH TRAWLING	243	0,68	0,010	0,018
SALT FISH TRAWLING	19	0,49	0,009	0,026*)
FACTORY TRAWLING	46	0,82	0,004	-0,005*)
INDUSTRY TRAWLING	367	0,93	0,026	0,139
PURSE SEINING	427	0,84	0,012	0,120
COASTAL SHRIMP TRAWLING	441	0,75	0,039	0,086
OCEAN SHRIMP TRAWLING	159	0,88	0,021	0,154

* Indicates not significant at 5% level.

The results of the calculations are presented in Table 5. The information given was the number of vessels included in the regression (n), the square of the multiple correlation coefficient (r^2) which shows the explanatory strength of the regression, and the estimated regression coefficients of the explanatory factors, length above water line (a_1) and year (a_2).

Therefore, the column for a_2 indicates the relative increase in replacement value for vessels in that group for the whole period.

The largest relative increase was found in the banks fishing fleet and the ocean shrimp fleet, with 16.4% and 15.4% average annual growth, respectively. Then came industrial trawlers, purse seiners and coalfish seiners which had an increase of well over 10% per annum, and then the two coastal groups (conventional and shrimp trawlers) with just under 10%. The three cod trawler groups had the lowest change while the factory trawlers had a reduction which in truth was not significantly different from zero growth.

21.

The growth coefficient (a_2) is not tied to the size of the vessel. It is a_1 which gives an expression for the covariation between replacement value and vessel length. Table 5 shows that the strongest covariation with vessel length can be found in the two coastal groups.

In order to show how the replacement value developed during the period studied, Figure 3 presents the results of

regression calculations for an average vessel (given vessel length) for each fishery group. The figure shows the magnitude of the replacement value for the vessel and how this developed over the period studied. With regard to the differences between the fisheries, this must be seen from the size of the vessel, which forms the basis for the calculations. Since the result for factory trawlers was found to be not significant, this group was not included in the Figure.

The Figure shows that the increase in replacement value was strong for the period covered. It must be remembered that these are deflated figures for vessels equal in size with regard to length. In Table 6 we have presented the same as in Figure 3, but in table form, to show the absolute and relative magnitude of the changes.

The increase in replacement value in fixed 1978 prices seems to be unbelieveably high for some individual groups. For instance, the average annual increase for a purse seine vessel of 150 feet was 1.6 million N.Kr, for an ocean shrimp trawler over 800,000 Nkr., for a banks fishing vessel 700,000 NKr. and for an industrial trawler 500,000 NKr. In other words, for these 4 groups we find a real doubling of the replacement cost in the course of 5 years. As a starting point, to see if this would be correct, we want to investigate how the changes were distributed over the three main components, hull, engine and equipment.

Figure 3. Calculated development of replacement value in 1978 prices for vessels with the same length above waterline within the various operational groups. (regression lines for given vessel lengths).

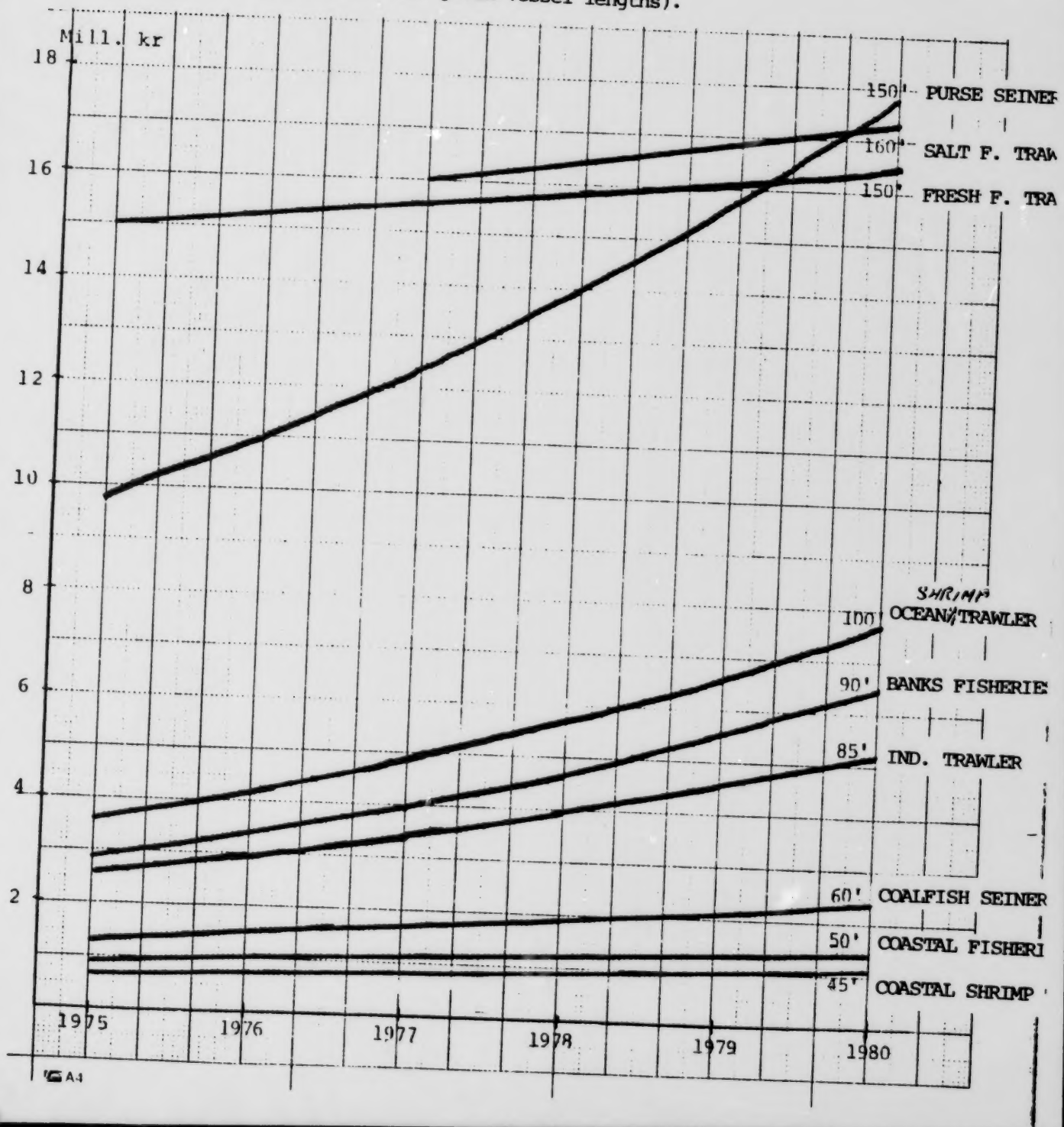


TABLE 6.

Calculated average changes in replacement value in fixed 1978 prices based on regression results in Table 5.
The results are given for a vessel of given size for the various fisheries.

Type of vessel	Replacement value in 1975. 1000 NKr.	Increase in replacement value from 1975-1980 Absolute 1000 NKr.	Relative %	Average annual increase 1000 NKr.
COASTAL FISHERY (50 feet)	870	532	61.2	106
BANKS FISHERY (90 feet)	2890	3688	127.6	738
COALFISH SEINER (60 feet)	1344	1052	78.3	210
FRESH FISH TRAWLER (150 feet)	15056	1423	9.5	285
SALT FISH TRAWLER (160 feet)*	16019*)	1295*)	8.1*)	432*)
INDUSTRIAL TRAWLER (85 feet)	2612	2621	100.3	524
PURSE SEINER (150 feet)	9778	8034	82.2	1607
COASTAL SHRIMP TRAWLER (45 feet	712	390	54.8	78
OCEAN SHRIMP TRAWLER (100 feet)	3593	4156	115.7	831

* Only applies to the year 1977 and the period 1977-80.

In a comparison of the calculated relative changes for each group in Table 6 and those found for the same groups in Tables 3 and 4, where no consideration was given to a possible change in the average size of the vessels, it appeared that, as expected, there was a certain difference. Nevertheless, in a study of how the changes were distributed over the main components, Tables 1 - 3, in the Table Appendix, were used without carrying out any further regressions. These correspond to the total average presented in Tables 3 and 4. 23.

The results are presented in Table 7 and show, as do Tables 3 and 4, the difference between the averages for 1980 and 1975. As can be seen, the changes in the replacement value of hulls causes the changes to be so great. Even relatively, this is the case although it is not evident from the table.

Of the total changes, the change in replacement value of hulls constitutes about 70% to 85% in all fisheries groups, with the exception of the codfish trawler groups where the percentages are a bit special due to a negative change for individual items. However, even for these groups, the hull drives the total change upward. Salt fish trawlers are actually the only group where one of the other items, the engine, shows a greater change than the hull. Nevertheless, there is no reason to place any particularly great emphasis on this, because this group had the fewest vessels and also provided better observations for the period 1977/80. 24.

How, then, can this strong increase in replacement value be explained? For the components, engine and equipment, the figures shown in Table 7 appear quite reasonable. The three groups which showed the greatest increase in replacement value for engines are purse seiners where the engine power, on average, increased from 1023 HP in 1975 to 1387 HP in 1980, the banks fishery where the figures are 362 HP in 1975 and 535 HP in 1980 and the industrial trawl fishery 423 HP in 1975 and 600 HP in 1980. In other words, an increase in value reflects an increase in engine power, but some is also caused by greater use of auxiliary engines/generators.

The changes in the replacement value of equipment are, for some groups, above and, for others, below the changes for engines in 1978 values. The three groups which showed the greatest change in the replacement value of engines are, together with coalfish seiners, also highest with regard to changes in equipment value.

In general, it can be said that for those fisheries which have had positive changes in the replacement value of equipment, the increase in replacement value of electronic equipment constitutes a large portion of the change. In addition to this general impression, the introduction of autoline in the banks long lining fleet drives this group up further. For coalfish seining and the purse seining fleet the hydraulic equipment also shows a great increase in replacement

TABLE 7.

Changes in average replacement value of Norwegian fishing vessels during the period 1975 - 80, by fishery and main components of the vessel. Fixed 1978 prices.

		HULL	ENGINE	EQUIPMT.	TOTAL
COASTAL FISHERY	1000 NKr.	337,1	11,7	55,8	404,6
	Relative distribution	83,3 %	2,9 %	13,8 %	100,0 %
BANKS FISHERY	1000 NKr.	2653,4	509,4	399,5	3562,3
	Relative distribution	74,5 %	14,3 %	11,2 %	100,0 %
COALFISH SEINING	1000 NKr.	1012,8	189,0	220,9	1422,6
	Relative distribution	71,2 %	13,3 %	15,5 %	100,0 %
FRESH FISH TRAWLING	1000 NKr.	2316,7	106,5	-1538,1	885,1
	Relative distribution	261,7 %	12,0 %	-173,7 %	100,0 %
SALT FISH TRAWLING	1000 NKr.	176,5	541,7	-401,3	316,9
	Relative distribution	55,7 %	170,9 %	-126,6 %	100,0 %
FACTORY TRAWLING	1000 NKr.	390,8	-2223,6	-671,9	-2504,8
	Relative distribution	-15,6 %	88,8 %	26,8 %	100,0 %
INDUSTRY TRAWLING	1000 NKr.	2748,7	383,9	207,5	3340,3
	Relative distribution	82,3 %	11,5 %	6,2 %	100,0 %
PURSE SEINING	1000 NKr.	4889,4	1024,4	1054,7	6968,4
	Relative distribution	70,2 %	14,7 %	15,1 %	100,0 %
COASTAL SHRIMP TRAWLING	1000 NKr.	374,8	35,2	56,6	466,6
	Relative distribution	80,3 %	7,6 %	12,1 %	100,0 %
OCEAN SHRIMP TRAWLING	1000 NKr.	1813,0	170,7	165,6	2149,3
	Relative distribution	84,4 %	7,9 %	7,7 %	100,0 %

* Applies to the period 1977-80.

value. This is due to greater demands for larger and more expensive equipment when increasingly larger seines must be handled during fishing and on deck. Industrial trawlers also showed a strong increase in hydraulic equipment. For the rest, there were only small changes in the replacement value of such equipment in the other groups.

With regard to factory equipment and all that this is includes, the purse seine fleet showed the greatest change in replacement cost. It is probably the RSW-plant and freezer space which constituted the main reason for the increase in this group.

The sharp reductions in the equipment column for codfish trawlers are, for the fresh fish trawlers, due to a sharp reduction in factory equipment and, for the factory trawlers, a reduction in the replacement value of electronic equipment.

26.

Changes in replacement value of equipment may therefore be explained in this way. The figures are average figures which, of course, may mask large individual differences, which we shall not examine in more detail here.

It then only remains to find an explanation for the change in the main column - the replacement value of hulls. The value of hulls includes, in addition to the hull itself, also the interior (cabins, galley, etc.) and wheelhouse. There is no

doubt that an average increase in standards has taken place in the fleet with regard to interior and the like. But whether that explains the large changes in hull values as shown in the results in Figure 3 and in Table 4, is rather doubtful.

Within the purse seiner, bank longliner fleet, industrial trawler and ocean shrimp trawler groups, extensive additional construction of shelter decks and new wheelhouses has taken place. It is also likely that other expenses, such as better interiors (cabins, galley, etc.), may have contributed to increasing the replacement value of hulls.

From Table 8 it is evident that within most of the groups a remodelling has been registered during the period 1975-80 for the 1980 sample. However, the reporting of such remodelling is rather deficient and does not show a complete picture of the extent. The figures for remodelling shown in Table 8 must therefore not be given much credence as an expression of the activity. In the Budget Committee's calculations of replacement value the costs of remodelling were included when they were given in the financial statements.

Table 8 also shows the number of new vessels built since 1975 in the 1980 sample. It is evident that the total relative proportion of newly-built and remodelled vessels is greatest for the groups: banks fishery, ocean shrimp trawler, purse seiner and the three codfish trawler groups. With the

TABLE 8.

The distribution of registered remodelling and new construction during the period 1975-80 in the 1980 sample, by fishery. Absolute figures and relative proportion of sample mass. Average age in sample for 1975 and 1980 distributed by fishery.

	Remodelled since 1975		New-built since 1975		Average age in	Average age in
	Number in 1980 sample.	Relative proportion of 1980 sample	Number in 1980 sample.	Relative proportion of 1980 sample.	1975 sample (year)	sample (year)
COASTAL FISHERY	1	0,7 %	17	11,3 %	23,8	25,3
BANKS FISHERY	2	4,7 %	17	39,5 %	21,4	12,2
COALFISH SEINERS	1	2,4 %	4	9,5 %	27,8	26,0
FRESH FISH TRAWLERS	0	0,0 %	10	23,8 %	0,0	8,9
SALT FISH TRAWlERS	0	0,0 %	1	16,7 %	-	9,8
FACTORY TRAWLERS	0	0,0 %	2	18,2 %	4,6	8,4
INDUSTRIAL TRAWLERS	1	2,3 %	5	11,6 %	23,8	23,1
PURSE SEINERS	5	8,1 %	10	16,1 %	23,1	21,9
COASTAL SHRIMP TRAWLE	0	0,0 %	0	0,0 %	31,0	31,5
OCEAN SHRIMP TRAWLERS	2	4,7 %	13	30,2 %	23,4	17,0

exception of codfish trawlers, this agrees with the groups which showed the greatest increase in repacement value. We must expect that new construction activity in these groups contributed to increasing the average replacement value because the building standards are higher in newly-built vessels than in vessels laid up.

This is, with doubt, a strongly contributing factor to the large increase observed in the value of hulls. During the period, the hulls became both broader and deeper than in the past in order to improve sea capacity, stability and working conditions on board. In the groups where there has been a large amount of new construction activity, this will show up as an increase in the average replacement value of hulls.

However, it is doubtful whether the building and remodelling evident in Table 8 can explain as much as a more than doubling of the replacement value from 1975 to 1980.

Another explanation for the strong increase may be that the price increase in ship building has been sharper than the price index we used. Our price index for hulls is based on the wholesale price index for wood and steel, as well as hourly wages in engineering workshops and is shown in Appendix 1.

28.

This prepared index shows a price increase of 43.5% from 1975 to 1980. We have used a relative index which was based on official indexes to relate the development of the

value to general price increases in society. This will provide an impression of the true development of the value.

However, there are also a series of other auxiliary items and other expenses which have influenced vessel prices during the period. Among them can be mentioned plastic, aluminium, electricity, public fees, social fees, etc.. These may be factors which have caused the price increase to actually be greater than our deflation index indicates. In addition, competition from the oil activity may have contributed to forcing workshop prices for new construction upwards. Should it be that the real price increase for construction of hulls for fishing vessels has been sharper than our price index indicates, then we can only state that there is still a certain amount of inflationary effects in the results presented by us.

As a comparision, both the total wholesale price index and the consumer price index rose about 50% during the period and hourly wages in engineering workshops rose by about 58 %. Even given a percentage price increase for fishing vessels equal to the 58% increase in wages, that is, 15 percentage points above our constructed price index, we are left, nevertheless, with a sharp increase in replacement value of hulls. This is evident in the results shown in Table 9 where some rough additional calculations of the averages were carried out to show how a price increase of 58% will show up.

In order to eliminate the discrepancy due to changes of average length in the sample during the period studied, Table 9 shows calculated replacement value in relation to average length for all groups for both years. In this manner, a true change, not tied to changes in the sample, was obtained. The rise in standards as a result of remodelling of interiors and the like, and the increase in average width was, nevertheless, included in the figure.

Such additional calculations using percentages are often more inaccurate and must be evaluated based on this. The results should, nevertheless, convincingly show that even with considerably sharper price increases than we used, the increase in replacement value of hulls for most of the groups will be quite substantial in real values.

If the price increase for building fishing vessels has been greater than our calculations (43.5%) and the general rate of inflation (about 50%), then it is reasonable that the capital costs (depreciation and interest) have been more of a burden for the fishing industry than for the rest of the economy.

Whether the average figures presented here express the true extent of the added cost or not, is difficult to state emphatically. In other words, we are talking about a real increase of about 150% for the banks fisheries fleet and the industrial trawler fleet, about 125% for the coastal shrimp

TABLE 9.

Average replacement value of hull, per foot, (at waterline)

in fixed prices at various stage of price increase.

	Fixed 1978 values at 43.5% price increase				Relative change
	1975	1980	Changes 1975-80		at a price increase of
	(NKrs.)	(NKrs.)	(NKrs.)	(Relative)	58.2%
COASTAL FISHERY	8800	16300	7500	85 %	68 %
BANKS FISHERY	16100	44600	28500	177 %	151 %
COALFISH SEINERS	10600	26700	16100	158 %	128 %
FRESH FISH TRAWLERS	50000	64700	14700	29 %	17 %
SALT FISH TRAWLERS	-	67500	-	-	-
FACTORY TRAWLERS	72500	80200	7700	11 %	0 %
INDUSTRIAL TRAWLERS	15800	44600	28800	182 %	155 %
PURSE SEINERS	29700	61400	31700	107 %	88 %
COASTAL SHRIMP TRAWLERS	6400	16000	9600	150 %	125 %
OCEAN SHRIMP TRAWLERS	21100	44500	23400	111 %	91 %

trawlers and coalfish seining vessels, about 90% for the purse seiners and ocean shrimp trawlers and about 70% for the coastal fleet. This is assuming a price increase of as much as up to 60% during the period studied. If a vessel has not added anything to the hull, apart from normal maintenance, then the replacement value can be better adjusted in step with the increase in construction costs. This follows the principle of calculating depreciation and would apply even if the hull would not be built the same if constructed today. Of course, is difficult to exclude additional expenses, which are quite normal today and considered quite necessary, even if the hull had not been that way originally. It is therefore impossible to completely overlook that such added costs are included in the replacement values, even for vessels which have not actually had such added costs, because building methods have changed.

30.

In addition, the sample of boat building which the Budget Committee has been using for information on building prices may be skewed. This, too, may apply to the sample of vessels used in the study. However, we feel this may only show up in minor incidental cases which may vary from year to year.

Another point which may explain some of the changes is that, even though the Budget Committee retained the main principles for the calculations, some minor adjustments were made which may have contributed to changing the replacement value more than the price increase would indicate. Such upward

adjustments may be based on conditions where, in previous years, the replacement value used was too low. If the replacement value was generally set too low in 1975, then it is obvious that the increase would be high if it was attempted to adjust it upward to a more realistic level in recent years.

However, it is likely that calculating replacement values for years with little new building activity would be more uncertain than for years with more new building. This should then indicate that replacement values at the beginning of the period studied were more on a level with true building prices than towards the end of the period studied.

The conclusion must therefore be that the results of the calculation of replacement values must be interpreted with caution. The deflated replacement values probably still contain a certain price increase effect, but how large it is, is difficult to state. It is also likely that the figures have a built-in increase which does not correspond to a true increase in the replacement value. However, this is not possible to quantify. This must therefore be kept in mind when interpreting the results which are based on calculations where we used replacement values in other chapters in the report. This applies, in particular, to Chapter 5 (Capital Intensity) and Chapter 7 (Utilization of Capital Assets).

31.

3.3 Gear value.

Since the value of fishing gear was not included in the figures discussed in this chapter, we will here take a look at their magnitude for the various fishing groups we examined.

The reason we have presented it in this manner and have not included gear values in the average calculations is, in part, because the Budget Committee treated these differently for the individual gear and, in part, because changes were made in method of treatment by the Budget Committee during the period studied. Therefore, based, in part, on other sources (FTFI report "Analysis of Operating Costs for Norwegian Fishing Vessels" by Thor B. Melhus, Bergen; March 1981) and, in part, on the Budget Committee's own information, attempts were made to estimate the total value of the fishing gear aboard a vessel in the course of one year, regardless of how fast it wore out and was exchanged for new gear. The Budget Committee assumes immediate write-off (lifespan of one year or less) for all gear except seines, which have an average lifespan of 5-6 years. These expenses are therefore directly posted as expenses for gear maintenance costs. It is, however, normal for nets also to have a lifespan of more than one year, normally 3-4 years, but due to great losses and therefore high annual replacements the costs for nets have also been entered in directly as expenses.

Table 10 must only be viewed as an approximate estimate of gear value, as there may be great differences and also great variations due to combinations of gear within most of the groups. 32.

The table also expresses the average level of gear value for the various vessel groups. Within each fishing group there may be a great spread in gear value according to type of gear used, size of gear and whether any investment has been made in several different types. Nevertheless, the figures provide a certain indication of the level of the value within the individual groups.

3.4 Disposal Value of Fishing Vessels.

The Budget Committee also calculated the assumed disposal value of vessels in the year investigated. In the Budget Committee's investigations, this was used as a basis for interest calculations.

It becomes immediately apparent that it is not so easy to determine the disposal value of Norwegian fishing vessels if we wish to have figures for the value the vessels really would be sold for if they were to be sold. In principle, the disposal value is determined based on market supply and demand according to the extent to which the vessels can be used alternatively as fishing vessels, freighters or the like. 33.

TABLE 10

Estimate of value of gear on board an average vessel, annually. 1978 NKr.

	Total value	Value per year
COASTAL FISHERY	55.000	12.500
BANKS FISHERY	120.000	12.000
COALFISH SEINING	200.000	30.000
FRESH FISH TRAWLING	400.000	30.000
SALT FISH TRAWLING	600.000	28.500
FACTORY TRAWLING	800.000	24.000
INDUSTRY TRAWLING	85.000	20.000
PURSE SEINING	900.000	77.500
COASTAL SHRIMP TRAWLING	25.000	12.500
OCEAN SHRIMP TRAWLING	200.000	27.500

The Norwegian market for disposal of fishing vessels is strongly influenced by regulations, licencing arrangements and so on. At the same time, prospects in the fisheries and, for instance, competition with other industries affect both the supply and the demand. Based on this, it is probably fair to say that it is impossible to determine an exact disposal value for a fishing vessel.

The Budget Committee bases its decisions on its calculated replacement values. Based on age of hull, engine and other equipment and a stipulated lifespan for individual items, calculations were made of the amount of replacement value written off. The disposal value is then, with some minor adjustments, set at the value remaining to be written off.

The calculated disposal value will therefore, to a great extent, provide an expression of the age of the fleet if we compare it to the replacement value. During the period 1975-80 the Budget Committee did not change the lifespan assessments used in the write-off of individual items. The hull was written off over 30 years, the engine over 12 years (vessels more than 80 feet) or 15 (other), electronic equipment over 8 years, hydraulic equipment over 10 years and, finally, the factory equipment was written off over 6.5 - 8 years, depending on the vessel group involved.

34.

Table 11 shows the development of the calculated

TABLE 11.

Average calculated disposal value of Norwegian fishing vessels distributed by fishery and year. Fixed 1978 prices.

	1975	1976	1977	1978	1979	1980
COASTAL FISHERY	413.900	460.400	483.500	459.500	561.800	542.100
BANKS FISHERY	1224.200	1450.000	2332.600	3360.500	4480.800	3985.600
COALFISH SEINERS	539.800	546.000	651.800	781.300	1099.400	1097.100
FRESH FISH TRAWLERS	9335.700	9016.500	8638.000	10344.400	9604.900	8597.300
SALT FISH TRAWLERS	-	-	9596.600	*	10072.800	11643.800
FACTORY TRAWLERS	21867.600	20114.700	20787.400	18405.500	14011.500	15637.000
INDUSTRIAL TRAWLERS	946.100	955.400	1155.700	1508.800	2274.000	2014.900
PURSE SEINERS	4122.000	5152.300	5849.700	6786.700	7680.800	7277.500
COASTAL SHRIMP TRAWLERS	257.300	296.100	289.100	294.000	354.700	313.900
OCEAN SHRIMP TRAWLERS	1994.400	3092.000	3241.700	2725.200	3835.500	3402.700

- no observations

* figures not available

disposal value in fixed 1978 Kroner, where we used the price index for hulls (Appendix 1) as the deflation factor. Two of the groups (banks fishery and ocean shrimp trawlers) showed a greater relative increase in disposal value than in replacement value. Based on the method of calculation, this should indicate that greater new building activity has taken place in these groups than in the other groups; this is also evident from Table 8. Table 12 also shows that these two groups (together with salt fish trawlers) are the only ones which can show a clear increase in disposal value when viewed in relation to replacement value.

Table 12 also shows that coalfish seiners, industrial trawlers and purse seiners have a relatively stable relationship. In other words, the new building activity remained even, so that the fleet, on average, had about the same age throughout the period, while new building activity in the other groups (the two coastal groups and fresh-fish/factory trawlers) did not keep pace with the natural aging process during the period studied. This can also be roughly determined by development in the average age found in Table 8.

35.

Table 12 also expresses how great a proportion of the replacement value the disposal value constitutes. It is evident that in 1980, the disposal value of an average vessel in the pure coastal shrimp fishery constituted only about 1/4 of the

TABLE 12.

Average calculated disposal value of fishing vessels, in percent of average replacement value.

	1975	1976	1977	1978	1979	1980
COASTAL FISHERY	47,4	48,7	47,4	42,5	41,4	42,4
BANKS FISHERY	48,0	53,3	55,0	63,4	68,2	65,2
COALFISH SEINERS	44,0	39,8	37,9	41,0	44,1	41,4
FRESH FISH TRAWLERS	70,4	69,9	68,4	66,1	64,2	60,7
SALT FISH TRAWLERS	-	-	58,2	*	65,0	69,2
FACTORY TRAWLERS	77,8	74,6	71,6	66,6	52,8	61,1
INDUSTRIAL TRAWLERS	36,9	35,1	32,0	36,0	39,3	34,1
PURSE SEINERS	48,7	50,7	46,7	45,0	50,0	47,1
COASTAL SHRIMP TRAWLERS	34,1	34,0	31,4	29,0	29,7	25,7
OCEAN SHRIMP TRAWLERS	48,7	54,1	40,6	42,9	58,3	54,5

- no observations

* information not available

replacement value, while the corresponding figure for an average salt fish trawler was slightly more than 2/3.

Based on what can be read in Table 12, there is a great difference in the value of the fleet, depending on the principle used to determine a value. The disposal value gives an expression of the value the vessel can be sold for, if a sale is desired. Since there is such huge over-capacity within individual fisheries, it is desirable to reduce the fleet and the disposal value is therefore of interest.

However, the major portion of the fleet will, even in the future, be involved with continued fishing, so that the sales value is not of the same interest. For these, the replacement value is the natural starting point when estimating the value of the fleet.

4.LABOUR FACTOR. 36.

The labour force in the fisheries has traditionally been affected by seasonal fluctuations in the fishery. The fishermen must follow the flow and supply of fish so that when it is high season then the labour force is also high.

Even though this has evened out with the present large ocean-going fleet, this force still has to follow schools of fish in the ocean. This makes it continually difficult to provide a proper measure of the input of the workforce in the fisheries.

In the available data from the Budget Committee, the average number of men on board, as well as how long the vessel fished during the year (operational period), are given. The concept "men on board" includes all those on board at the same time (skipper, steward, fishermen, etc.). It is therefore possible to have more persons on board during one season, for instance, so-called relief crew, than the average number of men on board would indicate.

The Budget Committee utilizes a weighted average of men on board for the whole year as a measure of the number of man-

TABLE 13.

Average input of work force per vessel in the Norwegian fishing fleet.

	1975		1978		1980	
	Man-year	Man-week	Man-year	Man-week	Man-year	Man-week
COASTAL FISHERY	4,9	186	4,5	169	4,4	170
BANKS FISHERY	9,6	338	10,1	375	10,3	416
COALFISH SEINING	6,4	254	6,2	237	6,7	276
FRESH FISH TRAWLING	14,0	602	13,3	537	13,5	383
SALT FISH TRAWLING	-	-	*	*	21,3	694
FACTORY TRAWLING	35,9	1577	33,5	1357	33,2	894
INDUSTRY TRAWLING	3,8	152	3,6	155	4,2	166
PURSE SEINING	11,2	391	11,4	394	11,6	323
COASTAL SHRIMP TRAWLING	2,1	79	2,0	83	2,0	83
OCEAN SHRIMP TRAWLING	8,2	305	7,5	300	7,2	281

- No observations
* Figures not available.

years. Weighting used were operational periods in the individual seasons. Such a definition of man-year will therefore mean that the work may have been carried out by more than one person. We, too, will use the concept man-year, as employed by the Budget Committee, but later on we will take a closer look at the input of labour this represents, particularly in comparison with industry.

Operational period here means the gross period from the time the gear is brought on board until final clean-up after the season closes. Operational period includes, therefore, the time spent in getting ready, loading, landings during the season, as well as the time at sea. Not included is the time used for annual maintenance and refitting the vessel, holidays, lay-up and the like.

In order to be considered a year-round operating fishing vessel by the Budget Committee, an operational period of 30 weeks or more is required (in recent years, vessels in any fishery subjected to strong regulations and long lay-ups, and therefore having fewer weeks of operational activity, have been included in the study). 37.

Table 13 shows the man-years (defined as average number of men on board for the year) and man-weeks per vessel for the 10 operational forms for three selected years. Man-year, as it appears here, will not be an unambiguous concept since, as previously pointed out, the work may have been carried out by

more than one person. This is due to the arrangement regarding crew changes, where different fishermen take part in different seasonal fisheries, and the labour input is so high that rules regarding free trips and similar conditions have been introduced.

In addition, and partly because of this, a man-year will include different inputs in working hours which vary between the various operational forms. To illustrate this a bit further, Table 14 provides an overview of the number of working hours per Budget Committee man-year. This figure also includes so-called "readiness service"* which is converted to direct working hours at a 9:1 ratio.

Changes in the number of hours from 1977 (1976) to 1978 are due mainly to changes in operational periods. With regard to the differences between the fisheries, operational period is also included, but the main difference lies in the special work operations required by the various gear and in the 24-hour cycle of the fishery. In Table 14 the group division into fisheries does not completely concur with our 10 groups as they are defined in Chapter 2 (see pages 6 and 7).

The concept "man-week" in Table 13 means the number of man-years multiplied by the operational period (in weeks). Here, too, the changes derived from changes in operational

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* Compulsory Military Refresher Training.-Tr.

TABLE 14.

Working hours per Budget Committee's man-year for various fisheries.

	1977	1978
Factory trawling	3456	35090
Salt fish trawling	3704	3366
Fresh fish trawling	2992	3319
Banks long lining, Vestlandet	3547	3678
Freezer shrimp trawling, Greenland	3496*	3680
Coastal longlining, Northern Norway	-	2526
Purse seining	2673*	2474
Industrial trawling		
(Norway pout/Sand eel)	2755	2914
Netting, handlining and Scottish seining		
Northern Norway	2236	-

* 1976

(Source: NOU 1980:22 Work Period in Fisheries).

period from year to year and between different fisheries are included. But this concept still hides the difference in working hours from fishery to fishery in the course of the week.

Nevertheless "man-year" and "man-week" are used in the calculations in this report because these are given in the data on a vessel level. It is therefore necessary to study the results in the light of the average figures in Table 14 to find the true labour input.

39.

Table 13 shows that there is a relatively stable number of man-years per vessel within each individual fishery. On the other hand, the figures vary sharply between the different fisheries, from 2 man-years on board a pure shrimp trawler on the coast to 33-36 man-years on board a factory trawler. In the figure for factory trawlers, the factory workers were also included. In the ocean shrimp trawler group, the freezer trawlers, which each have a crew of a total of 14-15 men, were also included. Therefore the figure for man-years in the table is, for this group, an average for shrimp vessels with and without on-board freezer capacity.

A sharp decline in man-weeks was evident for the codfish trawler groups and purse seiners. The decline was particularly large in the last two years (1979 and 1980) and was mainly due to reduced operating periods because of

regulations pertaining to these groups. In the Table Appendix (Table 14) the average figure for man-weeks is given for all the years of the period studied.

In order to further examine the development of the man-week factor, some simple linear regressions were made. The regression equation used is:

$$(1) \quad \ln V = a + b \cdot t + c \cdot \ln L$$

where V = man-week

t = year (1975-1980)

L = vessel length in feet

a, b, and c are coefficients to be estimated,

ln is the sign for the natural logarithm.

The model (1) is linear in the natural logaritms for man-weeks and vessel length, while the time variable is not logarithmically linear. The regression coefficient b, therefore, expresses the relative annual growth in the input of man-weeks. The regression calculations are in two steps. First, we only included the time aspect (that is, only the first part in model (1)).

Thereafter, the whole relationship in the regression calculation was included and the simultaneous relationship was obtained. The calculations of the regression were carried out for each fishing group independently of the other groups. The results are shown in Table 15.

Table 15 therefore, shows that the time explains very little of the changes in man-week input. By including vessel size in the relationship, a large portion of the variations is explained. This is reasonable since the crew is larger on board the large vessels. However, not even this explains all variations since it is only three groups which have r^2 above 0.50 in the simultaneous regression.

In the regression using only time as the explanation variable, only the coalfish seining vessel, salt fish trawler and coastal shrimp trawler groups show no significance. In addition, in the simultaneous regression industrial trawlers and ocean shrimp trawlers also indicate no significant estimate for **b** because the development which, in the first regression, caused it to be significant, actually was due to changes in vessel size during the period studied. On the other hand, the salt fish trawler group remains alone where the whole regression is non-significant.

Of the groups which show signifiance, only the banks long-liners showed a positive growth during the period studied, with an annual average of 2.8%. The largest negative growth was found for factory trawlers with - 9.7% as an annual average.

All the groups, with the exception of the three codfish trawler groups, showed significant (and positive) co-variation between man-week and vessel size, the largest being for coastal fisheries and ocean shrimp trawlers.

TABLE 15 REGRESSION RESULTS

Growth rate (b) and regression correlation with vessel length (c) for man-weeks for various main groups in Norwegian fisheries for the period 1975-1980.

	Time aspect only included in regression		Time and vessel length simult. incl. in regression		
	r^2	b	r^2	b	c
COASTAL FISHERIES	0,01	-0,023 (0,008)	0,22	-0,014*) (0,007)	1,437 (0,098)
BANKS FISHERIES	0,09	0,049 (0,010)	0,33	0,028 (0,009)	0,899 (0,099)
COALFISH SEINER	0,01**)	0,012*) (0,008)	0,21	0,006*) (0,008)	0,575 (0,076)
FRESH FISH TRAWLER	0,09	-0,043 (0,009)	0,10	-0,045 (0,009)	0,280*) (0,195)
SALT FISH TRAWLER	0,07**)	-0,052*) (0,047)	0,13**)	-0,048*) (0,047)	0,550*) (0,490)
FACTORY TRAWLER	0,50	-0,096 (0,014)	0,50	-0,097 (0,015)	-0,065*) (0,256)
INDUSTRIAL TRAWLER	0,01	0,022 (0,009)	0,52	-0,001*) (0,007)	0,908 (0,046)
PURSE SEINER	0,08	-0,033 (0,006)	0,36	-0,040 (0,005)	0,707 (0,052)
COASTAL SHRIMP TRAWLER	0,00**)	0,005*) (0,009)	0,09	0,004*) (0,008)	0,808 (0,124)
OCEAN SHRIMP TRAWLER	0,03	-0,046 (0,022)	0,58	0,008*) (0,015)	1,291 (0,090)

Figures in brackets are estimated standard deviation.

* Indicates the regression coefficient not significant at 5% level.

** Indicate the whole regression not significant at 5% level (that is that r is not significantly different from zero).

5. CAPITAL INTENSITY.

In this chapter we will be looking at the relationship between capital input and labour input in the Norwegian fisheries and how this varied with the fishery and over time during the period studied.

We use the replacement value (hull, engine and equipment) for the capital input, and man-years as an expression of labour input. The content of these concepts is as previously presented.

Table 16 shows the average figures for the relationship in fixed 1978 NKr. The table shows that the vessels in industrial fisheries (both purse seiners and trawlers) are the most capital intensive in the Norwegian fishing fleet with a capital value of 1.3 - 1.4 mill. NKr. (1978 value) for each man-year.

If we then add that the purse seiners also have the most expensive fishing gear (Table 10) and, in addition, that a man-year in this fleet is the lowest with regard to working hours (table 14), then we can safely determine that the purse seiners are by far the most capital intensive. This is the result of a development which took place particularly during this period, that is, the latter half of the 70's.

In chapter 3 it was shown that factory trawlers represented the greatest investments in the fleet. But, due to

the large number of man-years on board these vessels, they land right in the middle with regard to capital per man-year.

It is of interest to take a look at how the results presented in Table 16 relate to capital intensity in other industries, and whether the fisheries differ significantly from that which can be observed in other fields.

Calculations of capital intensity in industry by Industrial Statistics were used for comparison. The publication "Industrial Statistics" uses the concept "Fire insurance value per worker".

44.

The fire insurance value applies to structures, machinery, tools, gear and inventory. It is emphasized here that the figures are somewhat uncertain. There is reason to believe that this would be comparable to our information for replacement value of vessels and equipment. However, there is one difference since we, as mentioned, have not included the value of the fishing gear in, for example, Table 16.

With regard to figures for employment, they include all those working in the respective industries. The figures represent average employment for the year. This information is not comparable to man-years in the fisheries. That is primarily because of the use of relief crews within the individual fishery, but also because the fishermen, despite the use of relief crews, nevertheless, have more working hours per year than is normal for industry.

TABLE 16.

Average replacement value of vessels (hull, engine and equipment) per man-year in thousand 1978 NKr. (Empirical standard deviation in brackets).

	1975	1976	1977	1978	1979	1980
COASTAL FISHERIES	192,9	207,8	223,0	253,6	313,4	315,3
	(69,8)	(74,4)	(83,2)	(88,6)	(136,0)	(134,9)
BANK FISHERIES	316,6	281,8	426,2	520,9	623,5	597,7
	(327,6)	(91,8)	(129,6)	(113,1)	(89,0)	(129,7)
COALFISH SEINERS	186,9	221,6	258,5	299,1	365,7	374,3
	(63,1)	(41,9)	(95,0)	(130,2)	(170,8)	(170,4)
FRESH FISH TRAWLERS	959,3	938,0	979,8	1180,0	1134,3	1053,9
	(160,7)	(142,4)	(132,7)	(117,8)	(102,0)	(124,1)
SALT FISH TRAWLERS	-	-	782,8	*	761,7	792,3
	( )	( )	(201,3)	( )	(57,4)	(57,6)
FACTORY TRAWLERS	781,2	761,5	832,7	823,6	839,3	772,4
	(69,4)	(40,1)	(67,1)	(36,1)	(67,5)	(47,7)
INDUSTRIAL TRAWLERS	640,8	697,4	955,2	1111,9	1374,5	1388,8
	(203,1)	(207,8)	(324,2)	(371,5)	(377,1)	(394,3)
PURSE SEINERS	743,3	847,5	1065,7	1310,4	1351,1	1331,1
	(153,9)	(204,4)	(216,N)	(234,0)	(227,4)	(201,1)
COASTAL SHRIMP TRAWLERS	391,2	438,9	487,8	534,3	647,4	648,2
	(90,8)	(119,8)	(143,1)	(148,7)	(282,3)	(231,5)
OCEAN SHRIMP TRAWLERS	473,3	543,9	740,2	797,8	915,5	875,0
	(175,9)	(170,4)	(194,9)	(208,0)	(325,2)	(277,1)

- No observations

* Information not available

For instance, Industrial Statistics shows average man-hours per worker in the industrial economy to be 1612 in 1978 (1583 man-hours in 1980).

Table 17 shows the total average capital value per worker in industry and in individudal main groups of industry. The figures are current prices. The table applies to so-called large enterprises, that is, mainly those employing at least 5 workers.

In our group division of the fisheries, we have only included vessels over 40 feet at the water line (or 13 l.o.a). Of these groups, the coastal fisheries, industrial trawlers and coastal shrimp trawlers have fewer than 5 men on board, on average. Nevertheless, a comparison with industrial statistics for these groups is also of interest.

The changes from 1978 to 1980 are, for industry, slightly above 23%. If inflation is considered, then this would mean a true increase in capital intensity in industry, however small it might be.

45.

However, we will keep mainly to comparisons for 1978. If we look at Table 16 and the figures for 1978 then we will find that it is only the coastal fishing fleet and the coalfish seining fleet which have a lower capital intensity than the average for industry. These two groups are probably the ones which utilize relief crews the least (together with coastal shrimp trawlers).

TABLE 17.

Average fire insurance value per worker for the industrial economy in total and for individual main groups. Thousand NKr. current prices.

Code	Industry	1978	1980
3	Industry total	347	428
311	Foodstuff	343	422
31141	Salt fish, dried fish and split cod	226	289
31142	Frozen fish	263	332
31143	Fish canning	169	236
31151	Fish oil and fish meal	778	1,231
321	Textiles	268	301
341	Wood processing	851	1,070
351	Chemical raw material	1.229	1,664
353	Crude oil refining	4,837	4,893
371	Iron, steel and ferro alloy	559	707
382	Machinery	218	254

Source: Industrial Statistics

If we assume that there is an average of 1.5 workers in the other groups for each man-year, then the banks longliners would be about on the average for industry in 1978. The other groups will be above it.

It is not uncommon to have vessels which utilize one

and a half crews. But this may be a bit high as an average for a given group. Nevertheless, when we elected to use that figure in these comparisons, this was done because it concerned year-round operational vessels and because of the high number of hours for each man-year in the fisheries.

46.

The reduced operating period in the purse seine fleet in recent years, however, made it difficult to include relief crews here. This applied regardless of whether they were used or not. If the value of the purse seine was included, then the capital value for each man-year in the purse seine fleet would be about 1.4 mill. NKr. (If we use 1.5 workers per man-year then it would be about 930,000 NKr. per worker). The purse seine fleet is, therefore, just as capital intensive as the most capital intensive main groups in Norwegian industry, with the exception of oil refineries.

Fresh fish trawlers and industrial trawlers are also high.

If we had considered all year-round operating fishing vessels over 40 feet (even groups not included in our investigation), then the total average for 1978 would be about 620,000 NKr. in replacement value per man-year. In this average figure the figure for vessels used as weighting are those recorded by the Budget Committee. Included in the figure is also the value of gear with the estimates presented in Table 10. With an average of 1.5 workers per man-year, the capital

value was about 410,000 NKr. per worker. Since this is probably too high for relief crews as an average for this fleet, it is possible that the true figure will be somewhere between 410,000 and 620,000 NKr. per worker.

In comparision with the figures for industry from Table 17, it can be concluded that the fishing fleet (over 40 feet) is clearly more capital intensive than the average for industry.

In the Table Appendix, tables 15 - 24 present the replacement values for vessels per man-year according to vessel size. The tables show that capital intensity within each fishing group increases with the size of the vessel.

At the same time, it is evident that this does not apply across the groups. This must then indicate that capital intensity is realistically different from fishery to fishery. This is, of course, first and foremost, due to the various fisheries utilizing different size crews, so that the capital intensity shows great variations from fishery to fishery, even for vessel of the same size.

47.

The tables also show that within the individual group of sizes (regardless of what fishery), a relatively large change occurred in capital intensity from the beginning of the period to its end. This is an expression of a real increase in standards in the fleet (also evident in Chapter 3, even if some of the increase in replacement value was due to a price

increase effect beyond our deflation index) from 1975 - 80. At the same time, probably due to the rise in standards, a rationalization took place in the use of smaller crews on board vessels of the same size which again had a positive effect on capital intensity.

In other words, these two factors, separately and together, caused capital intensity to increase sharply. We looked at this further by carrying out regression calculations corresponding to those in the previous chapter.

Here, the relationship between capital intensity (replacement value of hull, engine and equipment per man-year) and vessel size and time (the period 1975 - 80) was looked at. The results are shown in Table 18.

If the results of the simultaneous correlation are examined, then we find that it is only salt fish trawlers and factory trawlers which do not show a significnt growth rate for the period studied. The greatest growth was found for ocean shrimp trawlers with a 16.1% average annual growth in capital intensity. Most of the other fishing groups also had a sharp annual growth rate of above, or just below, 10%.

Only fresh fish trawlers had relatively weak growth of 2.8% annually. In other words, together with factory and salt fish trawlers, the fresh fish trawlers show little or no development of capital intensity for the period studied. The

TABLE 18

Growth rate (b) and regression correlation with vessel length (c) for vessel value (replacement value in fixed 1978 NKr.) per man-year for the main groups in Norwegian Fisheries for the period 1975 - 80.

	Only time aspect included in regression		Time and vessel length simultaneously in regression.		
	r^2	b	r^2	b	c
COASTAL FISHERIES	0,23	0,105 (0,007)	0,31	0,111 (0,006)	0,894 (0,093)
BANK FISHERIES	0,51	0,187 (0,012)	0,71	0,157 (0,010)	1,302 (0,103)
COALFISH SEINERS	0,31	0,134 (0,013)	0,82	0,115 (0,007)	1,708 (0,067)
FRESH FISH TRAWLERS	0,16	0,038 (0,006)	0,40	0,028 (0,005)	1,047 (0,108)
SALT FISH TRAWLERS	0,00**)	-0,003*) (0,030)	0,01**)	-0,002*) (0,031)	0,131*) (0,320)
FACTORY TRAWLERS	0,01**)	0,003*) (0,006)	0,29	0,009*) (0,005)	0,377 (0,091)
INDUSTRIAL TRAWLERS	0,45	0,178 (0,010)	0,81	0,149 (0,006)	1,153 (0,044)
PURSE SEINERS	0,54	0,135 (0,006)	0,77	0,125 (0,004)	1,007 (0,049)
COASTAL SHRIMP TRAWLERS	0,25	0,098 (0,008)	0,34	0,096 (0,008)	0,868 (0,114)
OCEAN SHRIMP TRAWLERS	0,28	0,127 (0,016)	0,60	0,161 (0,013)	0,832 (0,075)

Figures in brackets are estimated standard deviation.

* Indicates that the regression co-efficient is not significant at the 5 % level.

** Indicates that the whole regression is not significant at 5% level (that is, that r is not significantly different from zero.

codfish trawler fleet was, in many ways, already developed technologically at the beginning of the 70's. It has not been possible to provide this fleet with new technological gains which could save on crew. Of course, some electronic fish finding equipment and navigational equipment has been introduced, but the size of the vessels has changed little since 1975.

49.

Due to the resource base for this fleet - the Norwegian Arctic cod stock - having been poorer from 1975 onward, with quotas and similar regulations to prevent further over-fishing, new trawler building activity declined. This, of course, affected the development of capital intensity in the fleet.

As expected, all groups showed a positive covariation between capital intensity and vessel size. The only group not to produce a significant co-efficient was salt fish trawlers. The strongest co-variation was found in the coalfish seining and bank longliner groups.

6. PRODUCTIVITY.

In this chapter we will take a closer look at productivity in the Norwegian fishing industry. One definition of productivity may be the result of a conversion process seen in relation to what we put in to the process. Here, we will take a look at the final amount of fish per unit of labour used, that is, per man-week.

Man-week is defined as the average number of men on board multiplied by the operational period in weeks. This covers variations in operational periods and thereby eliminates some of the differences behind the time input in one man-year as expressed in Table 14. But there will, nevertheless, still be different time inputs for each man-week from one fishery to another.

The chapter is in two parts because, as a result of the work process, we have used two measurements, the amount of fish caught and the value of processing. These are two measurements, both of which are interesting to examine more closely through an analysis of productivity in the fisheries.

6.1 Catch per man-week.

The amount caught was calculated based on income from catch data obtained from the Budget Committee. We calculated an average price for each Budget Committe group and year. By dividing the income by the price we obtained the catch

quantities used in the following calculations. In Appendix II further clarification of the calculations of average prices, used as a basis for the calculation of the amount caught, is presented.

Table 19 shows the results of calculations of average productivity development for the individual fisheries groups. The information is provided in kg caught per man-week and shows how much each group, on average, caught per week for each man on board. It is therefore difficult to compare all the groups mutually, partly because the groups fish for completely different fishing resources and, partly because the crews have different tasks, depending of type of fishery.

52.

With regard to differences founded in the resource base, it is evident that the catch was of completely different magnitudes for vessels fishing for pelagic resources than, for instance, vessels from the codfish fleet or the shrimp trawler fleet. The table also clearly indicates that differences exist here. The industrial fishery had an average catch per man-week which varied from 10,000 kg to 26,000 kg. For the codfish fleet, the catch was only one-tenth of this and varied from about 1,000 kg to about 3,000 per man-week while the shrimp trawlers had catches ranging from 250 kg to 1,200 kg. In the cod fisheries the quantity caught is given in dressed weight, while for the other groups (industrial trawlers, purse seiners and shrimp trawlers) it is given in round weight.

TABLE 19

Productivity development of labour force in Norwegian fisheries for the years 1975 - 80. Average catch (kg) per man-week (Empirical standard deviation in brackets).

	1975	1976	1977	1978	1979	1980
COASTAL FISHERIES	791	1093	1160	965	957	950
	(402)	(532)	(511)	(360)	(381)	(394)
BANKS FISHERIES	1345	1227	1313	1236	1396	1452
	(1187)	(375)	(513)	(331)	(332)	(368)
COALFISH SEINING	1120	1481	1756	1506	1469	1099
	(567)	(497)	(872)	(758)	(684)	(691)
FRESH FISH TRAWLING	3133	3394	3031	2669	2560	3345
	(592)	(763)	(446)	(424)	(574)	(560)
SALT FISH TRAWLING	-	-	1960	*	1740	2742
	( )	( )	(278)	( )	(609)	(442)
FACTORY TRAWLING	1966	1791	1807	1532	1788	2219
	(382)	(277)	(297)	(356)	(311)	(382)
INDUSTRIAL TRAWLING	10420	11710	12596	11924	14617	18747
	(3691)	(4459)	(4035)	(4646)	(5707)	(7587)
PURSE SEINING	16238	25750	25970	17793	21562	24716
	(5578)	(8725)	(7932)	(5866)	(6026)	(5511)
COASTAL SHRIMP TRAWLERS	250	348	342	329	349	432
	(104)	(160)	(205)	(195)	(157)	(267)
OCEAN SHRIMP TRWLERS	697	1132	1222	987	970	1113
	(389)	(252)	(333)	(287)	(394)	(365)

- no observations

* information not available.

There are also great differences from year to year, which are mainly the result of changes in the resource base. For that reason it is difficult to find an unambiguous trend in the developments in Table 19. Of the groups shown in the table, it is actually only the industrial trawlers, coastal shrimp trawlers and (maybe) the banks fisheries which indicate an immediate positive development in the amount of catch per man-week for the period studied. In the other groups there were greater fluctuations in the development.

The reason for the strong fluctuations in the productivity figures in Table 19 is likely to be because we were unable to exclude the effects of the fluctuations in the presence of the fish stocks fished for.

One expression of real change in productivity would be the amount of catch per man-week, if we could measure this for two years where other external conditions were equal. This is difficult to achieve properly because the fish population varies sharply from year to year and also affect on each other.

Estimates were made of the size of individual populations. Nevertheless, it was difficult to utilize these in such calculations because the groups studied often fished for several species over the same year. In addition to the uncertainty of the population estimates, they do not necessarily reflect "accurately" the availability of fish. If we assume two years where the population was the same, then other conditions,

such as weather, temperature, wind and so on, would, nevertheless, cause the years to be different with regard to whether it was easy or not for the fishing fleet to catch fish.

In Table 20 we have tabulated the Norwegian catches of various species of fish which, roughly, could be said to be the main basis for the fisheries groups shown in Table 19.

TABLE 20

Norwegian catches of various fish species for the period 1975 - 80.
1,000 tonnes round weight.

	1975	1976	1977	1978	1979	1980
Cod and codfish species	589	659	685	639	635	599
Dogfish, ling blue-ling and Cusk	60	71	61	59	71	75
Coalfish	136	152	156	140	156	177
Coalfish caught with seine	*	*	85	66	81	69
Sand eel and Norway pout	363	259	227	249	246	278
Herring fisheries excl. sand eel and Norway pout	1450	2366	2414	1615	1681	1425
Shrimp, coast.	5	6	5	5	6	8
Shrimp, ocean	14	19	21	27	27	37

* not known

Source: Fisheries Directorate's Fisheries Statistics.

Even though the catch figures do not provide an accurate expression of the availability of fish, the catch, nevertheless, provides a certain indication of how easy it was to get fish. This only applies, though, if there are no effective forms of regulation which result in smaller catches than would have been possible without regulations, and if there were no noticeable changes in the number of fishing vessels within each group.

If we now look at Table 19 in the light of information found in Table 20, then it can be seen that, for many of the groups, the fluctuations from year to year are often the same in both tables. If we look at the coastal fleet, which mainly fishes for cod and fish of the cod species, then the high productivity coefficients for the years 1976 and 1977 were due to the great supply of fish during these years.

54.

This indicates that, even though the production coefficient for 1980 was lower than 1976/77, productivity nevertheless rose during that period. This is supported by a regression calculation, which, however, does not consider the availability of fish. This calculation indicates that an increase in productivity of about 2 percent, on average, per annum took place for this group. (See Table 21).

During the period studied, the banks fleet on Vestlandet (the West Coast) mainly carried out longlining for

species such as dogfish, linge, blueling and cusk (but also for coalfish with nets) while the banks fleet in Nord-Norge (Northern Norway) which is smaller, in addition, also fished for large amounts of cod, haddock, Greenland halibut and others. In recent years, however, the banks longliner fleet on Vestlandet has been fishing more and more for cod in the Barents Sea during the fall and winter months instead of net fishing for coalfish at this time of the year. It was therefore difficult to look at the information in Table 20 as only an expression of the availability of fish for the banks fleet. Nevertheless, the development of the catch indicates that the supply of raw material did not change to any great degreee during the period. The results in Table 19, therefore, provide a good expression of the change in average productivity for this group.

Regression calculations in Table 21 indicate that if we do not consider that banks vessels have become larger on the average during the period, then productivity increased by a good 4% per annum. If we consider that some of the growth is due to the vessels having become larger, then the average annual growth is 2.7%.

It is difficult to find any development tendency in productivity for the coalfish seining fleet. The sharp drop in amount of fish caught per man-week in 1980 cannot be explained by a similar sharp drop in total quantity of coalfish caught,

nor by the portion taken by seine, even if there is a decline from the previous year with regard to seine-caught coalfish .

If we look at the calculated standard deviation in Table 19, we may notice that it is relatively high for coalfish seining in relation to the other groups. This indicates that conditions in the coalfish seining fishery are unstable and may vary greatly. This is something which is well known and in 1980 this fishery was particularly poor in Nord Norge (Northern Norway), and probably must bear a major portion of the blame for the decline in the productivity coefficient for that year. 55.

The regression calculations do not show any significant estimate of the growth in productivity for coalfish seining for that period.

With regard to uneven development, the three cod trawler groups are quite similar to coalfish seining. But while coalfish seining showed a strong decline in catch per man-week in 1980, all three of these groups showed a sharp increase.

The cod trawl groups fish for cod and codfish species. However, cod and haddock make up such a large portion of the catches that the catch development in Table 20 does not provide a good expression of fish supplies for the trawlers. Actually, the decline in the stock of these two species from 1975 was much sharper than the development of catch for cod and codfish species would indicate.

According to the overview of resources for 1980-81, issued by the Fishery Directorate's Oceanographic Research Institute, the total population has decreased from about 2.4 mill. tonnes in 1975 to about 1.5 mill. tonnes in 1980. There was also a decline in the total population of haddock from just below 0.7 mill. tonnes to 0.4 mill. tonnes during the period.

Not even the magnitude of stocks provides any clear picture of how easily the trawlers catch the fish. This depends on how the fish behave the ocean and how far from the shore they are found. In 1980 these conditions developed favourably for the trawlers even though the cod stock, seen as a whole, was at its lowest. The trawl fishery in 1980 was similar to the good year of 1975 at the same time as the fish was close inshore along the Finnmark coast and was heavily concentrated. This was without doubt the main reason for the increase experienced by the codfish trawlers in 1980. The results also indicate that when conditions are right the trawlers have good catches and that productivity in that part of the fleet is high.

57.

Due to changing conditions in the fleet from 1975, it is difficult to say anything about the development of productivity during that period. The regression calculations in Table 21 show that only the fresh fish trawlers had a significant regression relationship and that indicates a negative development. That productivity dropped is not likely,

TABLE 21. REGRESSION RESULTS.

Growth rate (b) and regression correlation with vessel length (c) for amount of catch per man-week for main groups in Norwegian fisheries during the period 1975-80.

	Only time aspect included in the regression		Time and vessel size simultaneous incl. in the regression.		
	r^2	b	r^2	b	c
COASTAL FISHERIES	0,00**)	0,016*) (0,009)	0,04	0,021 (0,009)	0,787 (0,136)
BANKS FISHERIES	0,04	0,041 (0,013)	0,11	0,027 (0,013)	0,603 (0,144)
COALFISH SEINING	0,00**)	-0,013*) (0,020)	0,08	-0,022*) (0,019)	0,876 (0,192)
FRESH FISH TRAWLING	0,02	-0,019 (0,008)	0,10	-0,027 (0,008)	0,850 (0,182)
SALT FISH TRAWLING	0,10**)	0,096*) (0,068)	0,11**)	0,096*) (0,070)	0,091*) (0,735)
FACTORY TRAWLING	0,03**)	0,024*) (0,019)	0,05**)	0,027*) (0,020)	0,236*) (0,333)
INDUSTRIAL TRAWLING	0,13	0,091 (0,012)	0,34	0,070 (0,011)	0,836 (0,078)
PURSE SEINING	0,03	0,038 (0,011)	0,36	0,024 (0,009)	1,443 (0,097)
COASTAL SHRIMP TRAWLING	0,05	0,064 (0,014)	0,08	0,062 (0,014)	0,794 (0,206)
OCEAN SHRIMP TRWLING	0,05	0,053 (0,018)	0,34	0,085 (0,016)	0,773 (0,094)

Figures in brackets show estimated standard deviation

* indicates that the regression coefficient is not significant at 5% level

** Indicates that the whole regression is not significant at 5 % level (that is, r is not significantly different from zero.)

nd the result would probably have been different had we been able to include a factor for the supply of fish for the fleet. As it stands now, it only illustrates the uneven development which took place at the end of the 70's.

The industrial fleet fishes mainly for sand eel and Norway pout in the North Sea. There may also be seasons with trawl fishing for capelin in the Barents Sea included in the group. Nevertheless, the catch development of sand eel and Norway pout fairly well indicate the supply of fish for this group. Table 20 shows that it was fairly stable, with the exception of 1975 which was an extremely good year. Since participation also reached its peak in 1975, it is not such a great mistake to assume in our calculations that the fish supply was constant for the whole period.

Assuming stable availability of fish for the period, the average figure in Table 19 provides an expression of a real productivity increase from about 10 tonnes in 1975 to almost 19 tonnes in 1980. The regression results in Table 21 show an annual average increase in productivity of a good 9%. If we take into consideration that the fleet obtained larger vessels during this period, then the growth is 7% per annum.

The industrial trawl fishery in the North Sea is a fishery which has developed from almost nothing since the beginning of the 1970's.

It is therefore natural to experience strong growth in productivity as vessel and gear become more adapted to the special conditions in this fishery and as the fishermen gain more experience with the work procedures and the fishing areas.

The development of the purse seine fleet began earlier than that of the industrial trawlers. The introduction of purse seines made the purse seine fleet quite effective. The proof of its effectiveness was found in the Atlantic Canadian herring stock becoming totally fished out by the end of the 60's. In the 70's the fleet fished for other species such as capelin, North Sea herring, mackerel, sprat and others, but was also placed under strict regulationss. The catch from the herring fisheries, excluding sand eel and Norway pout, shown in Table 20, provides a good expression of the catch by the purse seine fleet. Due to the strict regulations, it is doubtful that the catch figures can be used as an indication of supply of fish for the fleet. However, we know that in the years 1976 and 1977 the supply of capelin was very good. It is therefore reasonable to emphasize this as an explanation of the high average catches per man-week in Table 19 for those two years.

58.

If these evaluations were taken into consideration, then it appears as if an increase in the purse seine fleet productivity took place during this period. It is, however, difficult to determine the magnitude of this productivity. The

regressions carried out in Table 21 show an annual growth of 3.8% when not taking vessel size into account, and 2.4% when it is.

A regression calculation (not shown in the tables) where the amounts of catch from Table 20 were used as an indication variable for the availability of fish, produced a result showing better adaptation ($r^2 = 0.56$) and an annual growth of 6%.

In other words, the computations varied from a productivity growth of from 2.4% per annum to 6% per annum. The true growth in productivity was probably somewhere between these figures.

59.

Finally, we will look at the two shrimp trawler groups. The catch information in Table 20 shows that the expansion of the shrimp fishery occurred in the ocean fishery while catches by the coastal fleet remained at about 5 - 6,000 tonnes per year. The sharp development in the ocean fishery was due to constantly new discoveries of shrimp being made and the fleet having grown to accommodate expanded fishing in these new areas.

Assuming that the resource base and the supply of shrimp in the period were similar in proportion to the fleet which has always fished there, then both coastal and ocean fishing for shrimp experienced a productivity increase such as can be observed in Table 19. The annual average varies

somewhat, but the impression of a productivity increase is clear. This is also evident from the results of regressions shown in Table 21, where the annual increase is calculated as 6.2% for coastal shrimp trawlers and 8.5% for ocean shrimp trawlers, when changes in vessel size in the sample are taken into account.

In concluding this chapter, we can determine that the computations show that all fishing groups, with the exception of cod trawlers and coalfish seiners, showed a growth in productivity during the period 1975-80. The growth was uneven between the groups, with ocean shrimp trawlers and industrial trawlers experiencing the greatest growth. There are some uncertainties inherent in the calculations due to the great spread in the data available. This was also evident in the results of the multiple correlation coefficient (r^2), which was relatively small in most of the regressions.

The spread in the material was due to other factors which we have not explicitly included in the regression equation, such as fish availability for individual vessels, skipper effect and other factors which influence a fishing voyage.

With regard to codfish trawlers which showed no significance, we cannot conclude that these had no increase in productivity during this period. On the contrary, the results in Table 19 indicate that for 1980, when conditions were

favourable, productivity was higher than at the beginning of the period. It is the changing conditions in the resource base for the trawler fleet which causes the calculations not to produce results pointing unambiguously in one direction. 60.

It is also likely that the supply of resources for the coalfish seining fleet, in the same way as for the trawlers, caused us not to obtain reliable figures for the development of productivity for this fleet. Here, too, it is probable that an increase in productivity took place. However, we were unable to isolate it in our calculations.

In tables 25-45 in the Table Appendix, the average catch per man-week, distributed by year and vessel size, for each vessel group is presented. The results in the Table Appendix roughly confirm the impressions and conclusions of this chapter.

6.2. Value of processing per man-week

Up to now we have been looking at the amount of catch as an expression of productivity in the fishing industry. This is quite natural since the catch is related to catch rates, catch quotas and so on. In addition, it is often the catch that is discussed between people in their daily contacts. The concept 'daily catch' is strongly related to the fishing industry.

If, however, comparisons were made with other industries, as well as between both the cod sector and the so-

called herring sector within the fishing industry itself, then the figures for quantities are not appropriate. A value must be placed on the catch to obtain figures comparable across such dividing lines. This chapter will deal with such values.

Quantities of catch were also calculated on the basis of value, so that by utilizing figures for values we eliminated the uncertainty attached to the price calculations for the catches.

61.

Instead of looking only at the value of the catch, we will look at the processing value. This concept is used because it provides the best basis for comparison since we have subtracted product input from the sales value of the catch (the product). In this manner we then obtained an expression for the creation of a value which takes place in the production process in the industry.

The processing value is here calculated as gross catch income less fuel and other operational expenses such as bait, ice, salt, packaging, hired help, administration, social fees and others. In other words, the processing value expresses the creation of value which has taken place by the fish processing itself. This corresponds to the concept as it is defined in the Industrial Statistics, whereby comparisons with industry can be made.

In Table 22 the results of the average calculations in

fixed 1978 prices are presented. If this is compared with the results of catches shown in Table 19, then it becomes evident that the mutual ranking between the vessel groups has been somewhat shuffled, but not as much as we might have thought.

For 1980, the factory trawler, purse seine and salt fish trawler fleets all showed a processing value of more than 10,000.- NKr. per man-week. The coastal groups (both shrimp and cod) and the coalfish seining group show the least processing value per man-week with about 3,000.-NKr. These are the groups with the smallest vessels and require the least fuel. If, instead of processing value, the gross catch value had been used, then the result would have been quite different due to the great fuel consumption in the trawler and, to some extent, in the purse seine fleets. In the coastal fisheries, which go after shrimp and cod, a vessel uses an average of 30 tonnes of fuel per annum while a factory trawler, for instance, in a normal year requires 1,500 tonnes, that is, 50 times as much.

Even this measure of productivity showed great variations from year to year, but the variations, by and large, followed the changes we looked at in the previous chapter.

We refer also to Table 23, where the results of regression analysis for the processing value are shown.

64.

The regression calculations for the processing value

TABLE 22.

Development of productivity for labour force in Norwegian fisheries for the years 1975 - 80. Average processing value (1978-Nkr.) per man-week. (Empirical standard deviation in brackets).

	1975	1976	1977	1978	1979	1980
COASTAL FISHERIES	2,327	3.230	3,514	2,960	2,826	2,829
	(1,062)	(1,420)	(1,368)	(1,084)	(1,065)	(1,137)
BANKS FISHERIES	4,773	4,304	4,568	4,367	4,757	5,206
	(4,291)	(1,268)	(1,482)	(1,300)	(1,340)	(1,671)
COALFISH SEINING	2,344	3,052	3,647	3,104	3,007	2,204
	(1,226)	(1,053)	(1,922)	(1,626)	(1,451)	(1,480)
FRESH FISH TRAWLING	8.224	8.660	7,174	6,176	6,042	8,490
	(1,744)	(2.094)	(1,235)	(1,240)	(1,511)	(1,741)
SALT FISH TRAWLING	-	-	7.358	*	6.238	10.792
	( )	( )	(1.205)	( )	(2.456)	(1.695)
FACTORY TRAWLING	10.498	9.413	9,414	7,659	9.140	11,942
	(2.326)	(1.581)	(1.697)	(2.148)	(1.811)	(2.178)
INDUSTRIAL TRAWLING	3.579	4.073	4.465	4.129	5.164	6.985
	(1.306)	(1.612)	(1.455)	(1.614)	(2.058)	(2.922)
PURSE SEINING	6.480	10.819	10.792	6.955	8.600	10.230
	(2.429)	(3.843)	(3.427)	(2.412)	(2.459)	(2.296)
COASTAL TRAWLING	1.596	2.824	2.610	2.654	3.045	3.680
	(641)	(1.262)	(1.272)	(1.157)	(1.302)	(1.821)
OCEAN SHRIMP TRAWLING	4.338	7.609	7.260	5.933	6.010	7.345
	(2.487)	(1.638)	(1.882)	(2.171)	(3.637)	(2.931)

- No observations

* Figures not available

TABLE 23. RESULTS OF REGRESSION.

Growth rate (b) and regression correlation with vessel length (c) for processsing value in fixed 1978 NKr. per man-week for main groups in Norwegian fisheries for the period 1975 - 1980.

	Only time aspect incl. in regression		Time and vessel size simultaneously with regression.		
	r^2	b	r^2	b	c
COASTAL FISHERIES	0,00**)	0,015*) (0,009)	0,04	0,020 (0,009)	0,705 (0,131)
BANKS FISHERIES	0,03	0,035 (0,014)	0,13	0,018*) (0,014)	0,769 (0,148)
COALFISH SEINING	0,00**)	-0,020*) (0,021)	0,06	-0,028*) (0,020)	0,772 (0,202)
FRESH FISH TRAWLING	0,04	-0,032 (0,010)	0,11	-0,041 (0,010)	0,928 (0,222)
SALT FISH TRAWLING	0,10**)	0,110*) (0,079)	0,11**)	0,111*) (0,081)	0,212*) (0,850)
FACTORY TRAWLING	0,03**)	0,024*) (0,022)	0,03**)	0,026*) (0,023)	0,105*) (0,395)
INDUSTRIAL TRAWLING	0,14	0,102 (0,013)	0,29	0,084 (0,012)	0,732 (0,086)
PURSE SEINING	0,03	0,038 (0,012)	0,32	0,024 (0,010)	1,479 (0,109)
COASTAL TRAWLING	0,14	0,116 (0,014)	0,18	0,114 (0,013)	0,886 (0,202)
OCEAN SHRIMP TRAWLING	0,03	0,049 (0,021)	0,40	0,090 (0,017)	0,985 (0,102)

Figures in brackets are estimated standard deviation

* Indicates regression coefficient is not significant at the 5 % level.

** Indicates that the whole regression is not significant at the 5 % level, that is r is not significantly different from zero).

showed, as it did for the catches (Table 21), a poor overall adaptation, and many groups where the regression showed no significance. The results obtained nevertheless indicate a positive growth in productivity measured by processing value. Of the groups showing significant regression coefficients for growth, the coastal shrimp trawlers and industrial trawlers showed the strongest growth, at about 10% annually. This must be considered strong productivity growth. However, the result must be looked at in the light of the relatively poor adaptation which the regression analysis demonstrates, even if the two groups, as mentioned, are among the foremost with regard to correlation.

Most of the groups also show a positive covariation between productivity and vessel size. The strongest covariation can be found in the purse seine fleet.

In the Table Appendix (Tables 35-44) the average processing value per man-week, distributed by vessel size and year, is shown.

6.3. Comparison with industry.

In Chapter 4 we discussed the relationship between man-years in fishing and number of persons employed. We found that the number of persons employed for each man-year varied from fishery to fishery and that even in fisheries with extensive use of relief crews there are more working hours behind each person

TABLE 24.

Average processing value (1,000.-NKr.) per man-year in Norwegian fisheries in 1978 N/Kr.

	1975	1976	1977	1978	1979	1980
COASTAL FISHERY	88	121	127	109	103	108
BANKS FISHERY	167	155	164	162	184	211
COALFISH SEINING	91	120	144	115	116	89
FRESH FISH TRAWLING	355	268	266	250	236	235
SALT FISH TRAWLING	-	-	301	*	252	349
FACTORY TRAWLING	459	336	347	305	323	314
INDUSTRY TRAWLING	142	163	185	176	216	277
PURSE SEINING	225	367	342	239	274	287
COASTAL SHRIMP TRAWLING	63	114	106	111	131	153
OCEAN SHRIMP TRAWLING	163	285	277	232	235	286
AVERAGE	146	189	185	164	179	188

\- No observations

* Figures not available

employed in fishing than the average worker in industry. If we accept the same assumptions as in Chapter 4 where, for the coastal fisheries, coalfish seining and coastal shrimp trawler groups, we made a man-year approximately equal one worker and for the other groups we calculated 1.5 workers per man-year, then we have a starting point for comparison with the productivity figures from the Industrial Statistics.

Table 24 presents the processing value per man-year. The relative development in the table follows, by and large, the same pattern as that shown in Table 22. For individual fisheries which, particularly in 1980, were strongly regulated and resulting in considerably shorter operational period in weeks, we can observe the decline in productivity per man-year, while a rise is shown in Table 22 where we measured productivity per man-week. This is most marked for the cod trawler groups.

Table 24 shows, for instance, that one man-year in the coastal fishing fleet creates a value in 1978 NKr. of about 100,000 Kroner, while one man-year in the factory trawler fleet has a creation value of between 300 - 350,000 Kroner. With an average assessment of 1.5 worker per man-year in the trawler fleet, this means the same as an annual creation value of 200 - 230,000 Kroner per worker in factory trawlers.

66.

TABLE 25.
Average processing value excluding VAT (Value Added Tax) per worker for the industry as a whole and for the main sampling groups. 1,000 NKr. (current prices).

Code	Trade (type of industry)	1978	1980
3	Industry, total	99	120
311	Foodstuffs	25	35
31141	Salt fish, dried fish and split cod	73	90
42	Frozen fish	76	79
43	Canned fish products	53	68
31151	Fish oils and fish meal	137	136
321	Textiles	72	87
341	Wood processing	104	126
351	Chemical raw material	127	222
353	Crude oil refining	928	643
371	Iron, steel and ferro alloys	96	141
382	Machinery	119	143

Source: Industrial Statistics. Large firms

The average for the 10 groups is shown in the last line of Table 24. This average is therefore not an average for the fishing fleet seen as a whole, or for the the fleet over 40 feet, but only representative of our sample groups.

Nevertheless, if we examine the average for those 10 groups, then the creation of value varies roughly around 180,000 NKr. per man-year or about 120,000 NKr. per worker when we use 1.5 workers per man-year.

When we here utilize the factor 1.5, this may be too high, so that the actual figure is likely to be closer to 150,000 NKr. than 120,000 NKr.

If this is now compared with the data on industry shown in Table 25, then it is evident that productivity in the fisheries is well above the average for industry which, for 1978, was about 99,000 NKr. in processing value per worker. The 120,000 NKr. in 1980 corresponds to about the same when price increases are taken into account.

67.

If the individual fisheries groups are looked at and compared with the selected industrial groups in Table 25, then it becomes evident that the productivity measured in creation value (processing value) per worker is clearly greater in most of the fisheries groups than in the industrial groups; productivity for the fleet over 40 feet is, by and large, greater than that of industrial firms with 5 or more employees when measured in this manner.

This may, of course, be related to the extent of price subsidies which are much greater in the fishing industry than in other industries. For the period we studied, the transfer of subsidies from the State Budget to the fishing industry was particularly large. For the years 1975 - 1980 there were annual transfers varying from 500 -1,400 mill. NKr.

In Table 26, an overview of State support to the fishing

TABLE 26.

Subsidies paid to the fishing industry (total and share for price support) and catch value. The figures are given in Mill. Kroner (current prices).

	Total paid subsidies	Norwegian fishing total Value of catch	Price subs.	Percentage	Cod fisheries Value of catch	Price subs.	Percentage	Herring fisheries Value of catch	Price subs.	Percentage
1975	405.1	1,958.9	294.1	15.0%	1,256.1	223.3	17.7%	702.8	71.8	10.2%
1976	540.7	2,791.6	392.0	14.0%	1,718.2	326.1	19.05	1,073.4	65.9	6.1%
1977	563.7	3,087.5	433.7	14.1%	1,965.7	359.5	18.3%	1,121.8	74.2	6.6%
1978	446.4	2,920.0	308.3	10.6%	1,985.8	233.3	11.8%	934.2	75.0	8.0%
1979	749.1	3,142.3	351.4	11.2%	2,196.6	270.5	12.3%	945.7	80.9	8.6%
1980*	1,400.0	3,512.9	591.0	16.8%	2,502.0	450.4	18.0%	1,010.9	140.6	13.9%

* appropriated funds

Sources: Fisheries Statistics 1980. Economic overview for 1980. Parliamentary Reports No. 29 (1976-77), No. 37 (1978-79) and No. 116 (1980-81).

industry for the period studied is presented. The overview also shows the proportion allocated to price subsidies and its size in relation to the value of the catch, that is, from direct sales.

68.

The table provides information on what was actually paid out to the fishermen as price subsidies for the year, distributed over the cod fishery (including shell fish) and the herring fishery (including mackerel, capelin, etc.). This may differ somewhat from appropriations from the State Budget

because the financial resources remaining in the marketing boards at the end of the year may vary from year to year and because the boards may have been allowed to disburse unused funds from the previous period. The figures for 1980 are, however, for appropriated funds.

Subsidies given by way of fish prices varied from 294 million NKr. to 591 mill. NKr. during the period studied. Seen in relation to total catch value, the price subsidy in the period constituted an annual portion which varied between 10.6% and 16.8%. The cod fishery received the greatest portion, both in absolute terms and in relation to the catch value.

Price subsidies have been differentiated by geographic landing place, type of fish, size of fish and what the fish will be used for. This, of course, leads to individual variations from vessel to vessel with regard to absolute and relative magnitude of price subsidies. Unfortunately, there is no information available showing the distribution of the subsidies by individual vessels. It was therefore not possible to subtract this from the catch income so that the true creation of value without a price subsidy could be presented for the individivual vessels included in our sample. Nevertheless, in order to consider this, certain additional calculations were carried out, based on the average figures in Table 26.

In Table 27 the results of the additional calculations are presented, where the average figures for the portion of the price subsidy of the catch value was utilized to obtain an estimate of how it affects the creation of value per man-year. We have differentiated between the cod and herring sectors in our group division, but the calculations and the results shown in Table 21 must, nevertheless, be regarded as rough estimates and only taken as an indication of the magnitude.

69.

It can be seen that in relation to Table 24, there has been a clear reduction in all groups. The relative decline in processing value is, of course, greater than the average subsidy share of total catch value. The greatest change is found in the cod fishery for the whole period and for the year 1980, as is also evident from Table 26. For the rest, the development tendencies are the same as shown in Table 24.

If we now compare with productivity in industry as given in Table 25, then there appears to be no great difference. The average of about 100,000 NKr. per worker in industry is at the same level as the average in our sample, when the factor of 1.5 workers per man-year is used. Since this factor probably is somewhere between 1.0 and 1.5, on average, for the groups, the creation of value per worker in fishing industry is, nevertheless, somewhat above the average for industry.

TABLE 27.

Average processing value less calculated average price subsidy (1,000.-NKr.) per man-year in Norwegian fisheries, in 1978 NKr.

	1975	1976	1977	1978	1979	1980
COASTAL FISHERY	70	95	101	95	87	86
BANKS FISHERY	132	120	129	139	157	167
COALFISH SEINING	73	95	116	100	101	71
FRESH FISH TRAWLING	277	203	202	210	197	183
SALT FISH TRAWLING	-	-	232	*	212	274
FACTORY TRAWLING	362	257	268	259	273	246
INDUSTRY TRAWLING	124	150	170	158	193	232
PURSE SEINING	197	341	316	215	246	240
COASTAL SHRIMP TRAWLING	49	90	84	96	113	123
OCEAN SHRIMP TRAWLING	125	216	213	197	199	226
AVERAGE	120	158	156	143	155	152

- no observations

* Figures not available

However, there are great variations between the fishing groups, evident from the sampled industrial sub-groups shown in Table 25. Table 27 shows that in 1980 "the herring groups" (industrial trawlers and purse seiners) were at about the same level as salt fish and factory trawler groups, that is, those groups which process fish on board. If it is considered that the "herring groups" have fewer workers per man-year than the trawler groups, then the "herring groups", and particularly the purse seiners would be the fishery which, measured in this way, showed the greatest productivity in the fishing fleet. Compared with industry, the purse seine fleet (even the industrial trawler fleet, salt fish trawlers, factory trawlers and probably also the ocean shrimp fleet) represents a high level of productivity, measured by real value creation per worker.

During these comparisons between fisheries and industry it should be kept in mind that the fishing industry extracts its product directly from nature (catches the fish in the ocean) while industry usually process a product which they purchase on the market. To find the processing value for the fishing industry we have, therefore, only subtracted operating expenses since the fish in the ocean is "free", while, for industry, expenses for purchase of product input must also be subtracted. This difference may contribute to explaining the results obtained.

7. UTILIZATION OF CAPITAL ASSETS.

In Chapter 3 it was evident that there were great differences in the amount of capital invested in a vessel from fishery to fishery, measured by replacement value. Chapter 5 looked at the replacement value of a vessel in relation to the labour factor in the various fisheries. This chapter takes a look at average calculations showing the actual utlization of capital invested in the various fisheries groups in relation to catch and value creation. The calculations are attempts to determine in which fishery the invested capital was best utlized and whether there is conformity between it and degrees of capital intensity.

As in previous chapters, strong reservations must be held with regard to real development for the period selected, because the price development for vessel building and fishing equipment was actually stronger than our deflation index which, to a great degree, is based on the wholesale index. This, of course, greatly influences the relationship between catch results and vessel value and must be considered when interpreting the results.

A comparison with industry and the main groups will also be given, where it applies to processing value per unit of vessel replacement value.

7.1 Catch per unit of capital.

By looking at the catch per unit of capital, an expression of the effectiveness of capital invested in the various groups of vessels is obtained. For the fisheries, an average catch per 1,000.-NKr. real capital provides a good picture.

The replacement value of vessels and equipment was utilized here, as explained in Chapter 3. The value of gear is therefore not included in the calculations. This must also be taken into consideration when interpreting the results in Table 28.

72.

Table 28 shows the results of the average calculations. As expected, it can be seen that the two groups which supply raw material to the meal and oil industries have the greatest catches in relation to capital. In the cod fisheries it is actually the coastal fishery group which has the greatest return of catch for capital invested. Coalfish seining was somewhat higher than the coastal fleet but this, of course, is due to the special conditions in this fishery where the use of seines causes this group not to be completely comparable to the other groups in the cod fisheries. The lowest catch in relation to capital within the cod fisheries was found to be by the trawlers and, of these, the factory trawlers were, again, the lowest.

In other words, these results therefore indicate that

in the cod fisheries (except coalfish seining) the smallest vessels are the most effective in utilizing the capital invested and that the largest vessels are the least effective. This appears to be logical since it was found previously that the opposite was the case with regard to productivity of the labour force. There it was found that the largest vessels were the most productive.

This is also interesting, based on our knowledge that the smallest vessels having passive gear use the least fuel, both in absolute terms and in relation to catch obtained. This is a result which points in one direction concerning what should be ventured in new construction. However, there are a number of other factors which pull in the other direction. There is, for example, the desire for a stable raw material supply and a high total catch (use of the whole catch quota). For this purpose, large ocean-going vessels are, of course, needed, even if they are expensive and utilize the large capital invested in them less effectively.

There are also other items to be included with regard to the expenses of large vessels and which may also contribute to explaining the sharp increase in the replacement value for the period studied.

74.

Concern for increased stability, higher freeboard, construction of added shelter deck, better seaworthiness

TABLE 28.

Catches (in kg) per 1,000.- NKr, invested in the vessel's replacement value (1978 Nkr.), for the years 1975 - 80.
(Empirical standard deviation in brackets.)

	1975	1976	1977	1978	1979	1980
COASTAL FISHERIES	173	216	209	154	130	128
	(106)	(112)	(102)	(67)	(71)	(59)
BANKS FISHERIES	161	166	118	90	87	101
	(56)	(56)	(54)	(25)	(21)	(26)
COALFISH SEINING	240	268	281	209	174	127
	(99)	(95)	(100)	(105)	(82)	(58)
FRESH FISH TRAWLING	141	113	116	92	88	88
	(23)	(24)	(17)	(17)	(16)	(21)
SALT FISH TRAWLING	-	-	106	*	94	113
	( )	( )	(26)	( )	(39)	(27)
FACTORY TRAWLING	111	84	80	74	76	76
	(23)	(16)	(7)	(14)	(8)	(8)
INDUSTRIAL TRAWLING	673	692	587	480	460	544
	(221)	(219)	(195)	(183)	(172)	(190)
PURSE SEINING	764	1035	766	463	503	514
	(250)	(296)	(182)	(113)	(103)	(89)
COASTAL SHRIMP TRAWLING	26	34	30	26	26	30
	(10)	(16)	(17)	(14)	(12)	(17)
OCEAN SHRIMP TRAWLING	54	84	65	51	43	54
	(24)	(31)	(19)	(23)	(17)	(23)

- no observations

* figures not available.

properties, better accommodation, better space for operational combinations, and the like, are items which count more and more in new construction and remodelling in recent years. This forces the replacement value up, but, of course, also directly and indirectly, causes the productivity of the work force to increase.

Another impression gained from Table 28 is the decline from 1975 to 1980. With minor variations, the decline is almost consistent in all groups. This development was, of course, due not only to the reduction in raw material stock and thereby the catches, but also the increase in replacement value which was found to have taken place during this period. Even though the catch capacity increased, nevertheless the effectiveness, that is, the utilization of invested capital, was not good enough since the development went downhill. That was the result when the development was seen in relation to the general price development (wholesale price) for the period studied. If the true price changes for vessel building for the period were greater than we had expected, then the development would, of course, not have been as marked as indicated in Table 28. However, the table shows the development of the relative return during that period, based on the price development that took place.

Within the shrimp trawler groups the development was not as pronounced. These groups are lowest with regard to catches

per 1,000.- NKr. in capital equipment. This may possibly be explained by the great value of the product, so that conditions were changed when this was taken into consideration.

It is shown here that, for shrimp trawlers, the large ocean shrimp trawlers showed the best capital utilization. Here, therefore, the conditions were reversed from those observed in the cod sector. This is related to the good catches in the Barents Sea and near West Greenland for the period studied. The investments in, and the expansion of, this fleet, therefore, had a positive effect by making it possible to utilize any shrimp found.

75.

Regression calculations were also carried out for the development of the capital utilization for this period and how this varied with vessel size. The results are presented in Table 29. These results confirm, to a great degree, the impression shown in Table 28, that is, a negative trend for the period studied.

The only positive growth coefficient found was, however, not significantly different from zero. All the other groups were found to show a negative development for the period studied. The results presented in Table 29 indicate that the sharpest decline was estimated for the purse seine fleet. However, this result must be interpreted bearing in mind that this group is the only one to show a positive covariation with

vessel size. This means that the average in this group has not declined so sharply when the average vessel size has increased positively for the period studied. The results of the calculations must also be viewed based on the same comments as those for Table 28.

New information beyond that found in Table 28 shows that there is a negative covariation between capacity and vessel size, just as was found between the groups in the cod fisheries in Table 28.

However, the results are not significant for the shrimp trawlers with regard to covariation with vessel size. In other words, the opposite impression from Table 28 cannot be confirmed where the largest ocean shrimp trawlers utilize capital better than the smaller coastal trawlers. If, on the other hand, the regression had encompassed both shrimp trawl groups simultaneously, then the result obtained would probably have shown a positive covariation due to the great spread in mass with regard to vessel size, which the combined group would have had.

See Tables 45-54 in the Table Appendix for a more detailed study of the relationship between vessel size and capital utilization.

7.2. Processing value per unit of capital.

Another method of looking at the utilization of capital

TABLE 29. REGRESSION RESULTS.

Growth rate (b) and regression correlation with vessel length (c) for catch per 1,000 1978 NKr. in replacement value of vessel and equipment for the period 1975-80.

	Only time aspects incl.in regression		Time and vessel size simultaneously incl. in regression.		
	r^2	b	r^2	b	c
COASTAL FISHERIES	0,07	-0,087 (0,012)	0,07	-0,089 (0,012)	-0,168*) (0,168)
BANKS FISHERIES	0,25	-0,122 (0,014)	0,30	-0,108 (0,014)	-0,590 (0,151)
COALFISH SEINING	0,18	0,142 (0,020)	0,25	0,133 (0,019)	0,892 (0,191)
FRESH FISH TRAWLING	0,39	-0,092 (0,007)	0,40	-0,090 (0,008)	-0,244*) (0,168)
SALT FISH TRAWLING	0,01**)	0,026*) (0,078)	0,03**)	0,023*) (0,080)	-0,498*) (0,834)
FACTORY TRAWLING	0,24	-0,056 (0,015)	0,34	-0,065 (0,015)	-0,627 (0,250)
INDUSTRIAL TRAWLING	0,12	-0,080 (0,012)	0,17	-0,071 (0,011)	-0,378 (0,081)
PURSE SEINING	0,32	-0,130 (0,009)	0,35	-0,135 (0,009)	0,424 (0,103)
COASTAL SHRIMP TRAWLING	0,00**)	-0,020*) (0,015)	0,00**)	-0,020*) (0,015)	-0,008*) (0,227)
OCEAN SHRIMP TRAWLING	0,05	-0,059 (0,020)	0,05	-0,060 (0,021)	-0,009*) (0,123)

Figures in brackets are estimated standard deviation
* Indicates regression coefficient not significant at 5% level.
** Indicates the whole regression not significant at 5% level (that is, r not significantly different from zero.)

invested is to use value creation and look at it in relation to replacement value of the real capital. This gives an expression of how the capital was utilized to create value in the various fisheries groups.

Here we used the processing value less the calculated average price subsidy to obtain an expression for true creation of value. The results can be found in Table 30 and show the processing value as a percentage of replacement value of the capital.

The table is based on current prices and therefore shows the true value creation in relation to replacement value for each year. In this manner, the uncertainty was eliminated by using a deflation index which, perhaps, may not have given an accurate expression of the price increase. If there is a different price development for capital and fish then this will be evident by changes in the percentages in the table. Any over-estimation of the standards increase in the fleet by calculating the replacement values would, nevertheless, be visible in the table and provide a skewed impression of the development.

78.

The result showed a great variation in the percentage from above 50% to below 15% at the two extremes. The differences were particularly evident between the fishing groups, but there is also a marked change from year to year for

TABLE 30

Processing value less calculated price subsidy in percent replacement value of capital in the Norwegian fishing fleet for the period 1975-80.

	1975	1976	1977	1978	1979	1980
COASTAL FISHERY	33,3 %	47,1 %	52,9 %	41,1 %	32,7 %	33,0 %
BANKS FISHERY	39,9 %	48,6 %	34,8 %	27,5 %	29,5 %	33,5 %
COALFISH SEINING	28,3 %	37,5 %	43,3 %	37,7 %	32,8 %	24,4 %
FRESH FISH TRAWLING	24,6 %	19,4 %	20,6 %	17,8 %	15,6 %	17,1 %
SALT FISH TRAWLING			31,3 %	*	35,8 %	33,5 %
FACTORY TRAWLING	30,6 %	25,9 %	32,2 %	31,4 %	35,0 %	23,9 %
INDUSTRY TRAWLING	17,5 %	20,0 %	19,6 %	15,1 %	13,6 %	15,0 %
PURSE SEINING	27,4 %	38,6 %	25,5 %	16,3 %	15,9 %	17,1 %
COASTAL SHRIMP TRAWLING	15,1 %	19,4 %	19,1 %	19,2 %	19,6 %	18,9 %
OCEAN SHRIMP TRAWLING	31,1 %	39,1 %	31,0 %	26,2 %	21,8 %	24,3 %
AVERAGE GJENNOMSNITT	27,0 %	33,9 %	32,9 %	27,2 %	23,8 %	24,5 %

- No observations

* Figures not available.

the period studied. The average for the sample was about 34 % for 1976, and showed therefore a decline up to 1979/80 at the 24% level. With a less sharp development of replacement value, the decline would not have been as pronounced.

As a measure of the utilization of capital invested, Table 30 shows that the fishing groups, coastal fisheries, banks fisheries and salt fish trawling, are the best. Coalfish seining and factory trawling are also well positioned, but both show a pronounced decline in 1980.

TABLE 31.

Processing value in percent of fire insurance value of capital in industry and selected main groups.

Code	Industrial field	1978	1980
3	Industry, total	28.5%	28.1%
311	Foodstuff	7.4%	8.4%
31141	Salt fish, dried fish, split cod	32.2%	31.2%
42	Frozen fish	29.0%	23.9%
43	Canned fish	31.5%	29.0%
31151	Fish oil and fish meal	17.6%	11.1%
321	Textiles	27.0%	28.8%
341	Wood processing	12.2%	11.8%
351	Chemical raw material	10.4%	13.3%
353	Crude oil refining	19.2%	13.2%
371	Iron, steel and ferro alloys	17.1%	20.0%
382	Machineery	54.6%	56.3%

Source: Industrial Statistics. Large firms.

Table 31 shows the result of calculations for a similar measure for industry and certain selected main groups for the years 1978 and 1980. The industry total is at a solid 28% for both years. Total average for our fishing groups also developed from a higher level in 1976/77 to a clearly lower level in the last half of the period studied (1978/80). This indicates that the degree of utilization in fishing at present (1979/80) is lower than in industry in general. Years with a more normal resource situation in the fisheries show, nevertheless, a better degree of utilization in the various fisheries. The sharp price development for vessel building is probably above the average for industry and therefore influenced such a development. Otherwise, conclusions must nevertheless be drawn with a certain restraint due to the uncertainty regarding the replacement values of fishing vessels.

A comparison between Tables 30 and 31 indicates that several main groups in industry are below most of the fisheries with regard to utilization of capital invested. The figures for machine production indicate, however, that in the branches of industry having production at a high processing level, the industry showed good utilization of capital. This is also evident from information shown in Table 31 regarding final treatment of fish products for consumer use, whether it is conventional additional processing, freezing or canning. All these industries are above the average for industry total (with the exception of freezing of products in 1980).

APPENDICES

APPENDIX 1: Price indexes for the calculation of replacement value of vessels and equipment in fixed prices.

APPENDIX 2: Average prices for direct sale of fish from various fishing groups in the Norwegian fishing fleet during the period 1975 - 1980.

A P P E N D I X 1.

PRICE INDEXES FOR THE CALCULATION OF REPLACEMENT VALUE OF VESSELS AND EQUIPMENT IN FIXED PRICES.

We base this on the official wholesale price index for selected products and development of wages in engineering workshops. The development of these during the period studied is presented in the following two tables.

WHOLESALE PRICE INDEX

	1975	1976	1977	1978	1979	1980	Percent change 1975-80
Lumber and wood	86	93	100	98	101	116	34.9%
Iron and steel	96	100	100	111	118	123	28.1%
Non-electrical machinery	85	96	100	108	114	123	44.7%
Electrical machinery and equipment	91	96	100	105	112	122	34.1%

Source: Statistical Monthly, SSB (Central Bureau of Statistics).

Development in hourly wages of engineering workshops.

	1975	1976	1977	1978	1979	1980	Percent changes 1975-80
Average hourly wages in Kroner	27.44	31.90	35.68	38.95	40.18	43.44	58.3%

Source: Statistical Monthly, SSB.

Based on the two tables above, we have prepared an index with 1978 as the base year. The result is presented in the Table below.

3.

Indexes for price and wage development (1978 = 100).

	1975	1976	1977	1978	1979	1980
Lumber and wood	87.8	94.9	102.0	100.0	103.1	118.4
Iron and Steel	86.5	90.1	90.1	100.0	106.3	110.8
Non-electric. machinery	78.7	88.9	92.6	100.0	105.6	113.9
Electr. machinery & equipment	86.7	91.4	95.2	100.0	106.7	116.2
Hourly wages in engineering workshops	70.4	81.9	91.6	100.0	103.2	111.5

The vessel sample included both wood and steel vessels where the figure for wood vessels was about twice the figure for steel vessels. At the same time, the steel vessels were somewhat larger than the wooden vessels. The Table below shows the distribution of building material and vessel length for the whole sample used by the Budget Committee (in other words, it includes more vessels than our sample).

Number of vessels in the Budget Committee´s study.

	1975				1978			
	Wood	Steel	Other	Total	Wood	Steel	Other	Total
40-80 feet	392	21	14	427	382	26	2	410
80-120 feet	21	58		79	16	71		87
120-160 feet		91		91		95		95
160 feet and over		16		16		28		28
Total	413	186	14	613	398	220	2	620

With regard to building material, we have therefore used a 50 - 50 percent distribuition of the value. The same was done for calculating the cost of material and expenses for wages. Based on this, the following price index for vessel hulls using the following formula was prepared:

$$\text{Hull index} = \frac{\frac{\text{Wood index} + \text{Steel index}}{2} + \text{wage index}}{2}$$

For engines, hydraulic equipment and factory equipment, we used the wholesale price index for non-electrical machinery and for electronic equipment we used the whole sale price index for electrical machinery and equipment.

4.

Based on this, the following price indexes were arrived at and were used in deflation calculations of the Budget Committee's replacement values for vessels and equipment:

Price indexes used in the report.

	1975	1976	1977	1978	1979	1980	Percent changes 1975-80
Hull	78.8	87.2	93.9	100.0	104.0	113.1	43.5%
Engine, hydr. equip. and factory equipment	78.7	88.9	92.6	100.0	105.6	113.9	44.7%
Electronic equipment	86.7	91.4	95.2	100.0	106.7	116.2	34.1%

A P P E N D I X 2.

AVERAGE PRICES FOR DIRECT SALE OF FISH FROM VARIOUS FISHING GROUPS IN THE NORWEGIAN FISHING FLEET DURING THE PERIOD 1975 - 1980.

In order to calculate the quantities of catch based on gross catch value of the vessels in the Budget Committee's sample, it is necessary to have an average price for the catch. The fishing groups used by the Budget Committee mainly fish for defined fish species. It was therefore possible to construct a rough average price which would be quite realistic for most of the catch, based on each Budget Committee group.

Nevertheless, there will be a certain amount of uncertainty since individual vessels may have had seasons where they fished for species of fish where the price level would be quite different at direct sale. But, by and large, the groups are sufficiently homogeneous for the deviation which would occur in this manner not to be greater than is acceptable in the calculations.

We will here briefly explain how we proceeded to calculate the average prices for fish from the various Budget Committee groups and also present the results.

Table showing relationship between Budget Committee groups and our ten fisheries groups for the various years included in the study.

	1975	1976	1977	1978	1979	1980
	Budget Committee Group Codes					
COASTAL FISHERY	001 002 003 004 005 007	001 002 003 004 005 007	001 002 003 004 005 007	001 002 003 004 005 007	001 002 003 004 005 007	001 002 003 004 005 007
BANKS FISHERY	008 009	008 009	008 009	008 009	008 009	008 009
COALFISH SEINING	010 011	010 011	010 011	010 011	010 011	010 011
FRESH FISH TRAWLING	026	026	026	026	026	027
SALT FISH TRAWLING			025	025	025	026
FACTORY TRAWLING	027	027	027	027	027	028
INDUSTRIAL TRAWLING	018	018	018	018	018	019
PURSE SEINING	021 022 023	021 022 023	020 021 022 023	020 021 022 023	020 021 022 023	021 022 023 024
COASTAL SHRIMP TRAWLING	012 014	012 014	012 014	012 014	012 014	012 014
OCEAN SHRIMP TRAWLING	016	016	016 017	016 017	016 017	017 018

The calculations of the averages employed data from two sources: The Fisheries Statistics and the Trawl Statistics.

The Trawl Statistics contained the quantities and values of catches for the three cod trawling groups: Fresh fish trawling, Salt fish trawling and Factory trawling. These statistics will therefore provide a correct average price for these three groups.

As far as the other groups are concerned, the greatest difficulty was to assign the correct weight to the various species of fish, taking into consideration the composition of the catch. This applied, in particular, to the coastal and banks fisheries. The problem was solved by using the same composition as the total of all catches for the various fish species in the Fisheries Statistics. To the extent that the groups in the Budget Committee are geographically limited (province or region) we used the total catch of the various species of fish in the same area as weight. For the banks fishery in Northern Norway, however, we used the same species composition as for the coastal fishery in Northern Norway.

6.

Below is shown the type of fish species included in the various groups when calculating the average price at direct sale from the same groups. The prices were calculated for each Budget Committee group included in the groups in the overview.

7.

Using this method, we calculated the average prices for each Budget Committee group. On this detailed level we then calculated the quantity of the catch for each individual vessel

using the price. Thereafter, we added the groups together to form ten fishery groups as explain in the first table in this appendix.

COASTAL FISHERY	BANKS FISHERY (south)	COALFISH SEINING	INDUSTRIAL TRAWLING	PURSE SEINING	SHRIMP TRAWLING
Halibut	Halibut	Coalfish	Norway pout	Capelin	Shrimp
Plaice	Greenland Halibut		Sand Eel	Hake	
Greenland Halibut	Cod			North Sea Herring	
Haddock	Ling			Mackerel	
Cod	Blue Ling			Scad (Horsemackerel)	
Whiting	Haddock			Ocean Sprat	
Pollack	Dogfish				
Coalfish	Cusk				
White Salmon					
Redfish					
Catfish					
Crab					
Lobster					

The table below shows the calculated average prices for each Budget Committee code. Please note that the Budget Committee changed the codes somewhat during the period studied.

Calculated average prices of fish distributed according to the Budget Committee vessel groups.

Budget Committee No.	1975	1976	1977	1978	1979	1980
001	2,09	2,59	2,95	3,17	3,26	4,03
002	2,15	2,70	3,08	3,19	3,32	4,05
003	2,50	3,01	3,51	3,52	3,61	4,23
004	2,11	2,62	3,00	3,18	3,28	4,03
005	2,50	3,01	3,51	3,52	3,61	4,23
006	-	-	-	-	-	-
007	2,51	3,07	3,53	3,54	4,07	4,48
008	3,14	4,12	4,42	4,45	5,38	5,92
009	2,24	2,75	3,17	3,32	3,41	4,10
010	1,38	1,79	2,05	2,28	2,50	3,19
011	1,24	1,62	1,86	2,13	2,36	2,89
012	5,66	6,32	6,81	6,44	6,87	7,05
013	5,66	6,32	6,81	6,44	6,87	7,05
014	8,77	8,25	9,91	12,48	13,27	12,72
015	8,77	8,25	9,91	12,48	13,27	12,72
016	7,35	6,92	7,31	10,02	11,43	12,72
017	-	-	6,81	6,44	6,87	12,15
018	0,30	0,35	0,41	0,43	0,44	7,05
019	-	-	-	-	-	0,46
020	-	-	0,40	0,48	0,47	-
021	0,39	0,41	0,40	0,48	0,47	0,55
022	0,39	0,41	0,40	0,48	0,47	0,55
023	0,39	0,41	0,40	0,48	0,47	0,55
024	-	-	-	-	-	0,55
025	-	-	4,45	4,69	6,06	-
026	2,26	2,63	2,91	3,13	3,20	5,46
027	3,65	4,65	6,00	6,46	7,29	3,74
028	-	-	-	-	-	6,21

Based on the table above, the following more comprehensive table can be presented over the price development for groups which better approximate our group division.

Price table for various fisheries groups.

Price in Kroner per kg. fresh weight.

	1975	1976	1977	1978	1979	1980
COASTAL FLEET, SOUTH. NORWAY	2,51	3,07	3,53	3,54	4,07	4,48
COASTAL FLEET. NORTH. NORWAY	2,24	2,75	3,17	3,32	3,41	4,10
BANKS LONGLINING. S.NORWAY	3,14	4,12	4,42	4,45	5,38	5,92
COALFISH SEINING, SOUTH. NORWAY	1,38	1,79	2,05	2,28	2,50	3,19
COALFISH SEINING, NORTH. NORWAY	1,24	1,62	1,86	2,13	2,36	2,89
FRESH FISH TRAWLING	2,20	2,55	2,91	3,13	3,20	3,74
SALT FISH TRAWLING	3,25	4,32	4,45	4,69	6,06	5,46
FACTORY TRAWLING	3,65	4,65	6,00	6,46	7,29	6,21
INDUSTRIAL TRAWLING*	0,30	0,35	0,41	0,43	0,44	0,46
PURSE SEINING*	0,39	0,41	0,40	0,48	0,47	0,55
SHRIMP TRAWLING, SOUTH*	8,77	8,25	9,91	12,48	13,27	12,72
" " , NORTH*	5,66	6,32	6,81	6,44	6,87	7,05
" " , OCEAN FISHERIES*	7,35	6,92	7,31	10,02	11,43	12,15
COASTAL FLEET, TOTAL	2,30	2,81	3,24	3,36	3,55	4,21
COALFISH SEINING, TOTAL	1,29	1,70	1,95	2,20	2,42	3,05
COD TRAWLING, TOTAL	2,53	3,01	3,53	3,83	4,16	4,35
SHRIMP TRAWLING TOTAL*	6,79	6,85	7,33	7,67	8,19	8,10
INDUSTRIAL FISHERIES, TOTAL*	0,37	0,40	0,40	0,47	0,47	0,53

*Prices given per kg. round weight.

TABLE APPENDIX

TABLE 1.

Average replacement value of hull in the Norwegian Fishing fleet, in fixed 1978 Kroner. (Empirical standard deviation in brackets).

	1975	1976	1977	1978	1979	1980
COASTAL FISHERY	431.300 (140.700)	447.600 (107.500)	546.200 (191.200)	559.500 (181.600)	829.300 (541.000)	768.400 (252.900)
BANKS FISHERY	1337.500 (479.000)	1347.100 (528.700)	2695.500 (995.000)	3336.600 (1109.200)	4368.100 (906.200)	3990.900 (1078.300)
COALFISH SEINERS	591.700 (292.000)	589.300 (134.700)	924.400 (509.700)	1005.300 (686.100)	1524.700 (938.100)	1604.500 (973.300)
FRESH FISH TRAWLERS	6734.700 (898.900)	7195.600 (1198.400)	7100.300 (912.400)	9580.000 (1209.600)	9234.400 (654.900)	9051.400 (664.000)
SALT FISH TRAWLERS	- ( )	- ( )	10410.000 (2742.800)	* ( )	9501.400 (1633.100)	10586.500 (686.000)
FACTORY TRAWLERS	15069.800 2004.000)	14664.600 (1892.800)	17333.300 (2042.700)	16012.700 (1641.500)	15261.500 (1948.900)	15460.600 (1567.500)
INDUSTRIAL TRAWLERS	1235.600 (632.100)	1352.200 (638.800)	2287.900 (1324.700)	2675.400 (1512.900)	3913.300 (1635.400)	3984.300 (1736.300)
PURSE SEINERS	4160.100 1447.400)	4531.300 (1667.900)	7142.300 (1909.500)	8764.600 (2173.800)	8753.400 (1734.600	9049.500 (1745.100)
COASTAL TRAWLERS	372.900 (78.900)	408.800 (83.000)	479.100 (112.500)	530.000 (159.600)	691.100 (372.200)	747.700 (285.800)
OCEAN TRAWLERS	2052.800 (1369.600)	2968.800 (1719.300)	4820.900 (2452.200)	3963.900 (2640.500)	4125.300 (2185.100)	3865.800 (2210.500)

- No observations

* Figures not available.

TABLE 2.

Average replacement value of engines in the Norwegian Fishing fleet, in fixed 1978 Kroner. (Empirical standard deviation in brackets.)

	1975	1976	1977	1978	1979	1980
COASTAL FISHERIES	245.700	284.300	239.800	264.400	282.500	257.400
	(93.600)	(112.700)	(102.700)	(117.300)	(131.700)	(97.800)
BANKS FISHERIES	552.600	722.700	767.800	1042.900	1103.400	1062.000
	(245.800)	(285.100)	(285.800)	(268.700)	(268.200)	(385.400)
COALFISH SEINERS	308.500	389.400	365.000	434.500	487.400	497.500
	(122.000)	(137.900)	(248.700)	(228.400)	(382.100)	(408.700)
FRESH FISH TRAWLERS	2304.800	2664.900	2449.400	2852.400	2842.500	2411.300
	(399.000)	(319.200)	(468.900)	(218.800)	(255.800)	(342.700)
SALT FISH TRAWLERS	-	-	2119.300	*	2532.500	2661.000
	( )	( )	(1351.200)	( )	(394.700)	(596.800)
FACTORY TRAWLERS	5124.900	4443.200	3812.100	4114.500	3746.200	2901.300
	1604.600)	(580.600)	(944.200)	(358.700)	(293.500)	(325.800)
INDUSTRIAL TRAWLERS	667.900	756.700	682.200	852.700	1102.200	1051.800
	(409.200)	(329.500)	(392.300)	(527.400)	(639.400)	(498.200)
PURSE SEINERS	1938.000	3007.800	2750.700	3312.900	3470.000	2962.400
	(609.300)	(1086.800)	(1077.800)	(1144.500)	(1035.600)	(774.100)
COASTAL TRAWLERS	204.900	238.400	213.100	232.300	251.900	240.100
	(83.000)	(99.600)	(88.800)	(95.600)	(96.700)	(106.400)
OCEAN TRAWLERS	930.600	1292.900	1274.300	1127.500	1241.000	1101.300
	(649.400)	(725.000)	(812.800)	(754.600)	(751.600)	(629.200)

- No observations

* Figures not available.

TABLE 3.

Average replacement value of electronic, hydraulic and factory equipment in the Norwegian fishing fleet, in fixed 1978 Kroner. (Empirical standard deviation in brackets).

	1975	1976	1977	1978	1979	1980
COASTAL FISHERIES	196.400 (88.100)	213.500 (83.700)	233.600 (101.100)	257.800 (105.700)	246.300 (95.000)	252.200 (109.600)
BANKS FISHERIES	660.500 (262.400)	653.300 (296.900)	775.300 (286.200)	917.600 (320.400)	1095.800 (284.800)	1060.000 (367.700)
COALFISH SEINERS	326.400 (195.800)	392.200 (128.200)	431.700 (182.800)	465.700 (325.000)	479.700 (340.300)	547.300 (460.400)
FRESH FISH TRAWLERS	4229.700 (818.700)	3037.400 (443.300)	3071.500 (559.100)	3208.100 (366.700)	2877.400 (339.300)	2691.600 (338.700)
SALT FISH TRAWLERS	- ( )	- ( )	3975.200 (2236.000)	* ( )	3465.600 (763.900)	3573.900 (833.800)
FACTORY TRAWLERS	7922.100 (344.500)	7905.100 (422.700)	7883.900 (657.700)	7490.900 (383.300)	7524.600 (246.500)	7250.200 (297.800)
INDUSTRIAL TRAWLERS	664.200 (435.000)	610.100 (281.400)	640.700 (291.700)	658.400 (251.200)	766.500 (398.900)	871.700 (440.200)
PURSE SEINERS	2371.100 (895.700)	2628.800 (978.900)	2631.200 (960.800)	2990.900 (1016.500)	3150.700 (1102.700)	3425.800 (848.100)
COASTAL TRAWLERS	177.000 (37.100)	224.000 (51.600)	229.100 (54.000)	252.800 (52.700)	252.500 (55.300)	233.600 (58.700)
OCEAN TRAWLERS	1114.622 (773.300)	1463.500 (1015.000)	1893.300 (1230.400)	1257.900 (954.800)	1209.800 (922.700)	1280.200 (863.300)

- No observations

* Figures not available.

TABLE 4. COASTAL FLEET

Average replacement value of vessel (hull, engine and equipment) in 1,000 Kroner (1978 values).

		1975	1976	1977	1978	1979	1980
30-30.9[1] feet	No. of vessels	-	-	-	-	-	9
	Average	-	-	-	-	-	754,0
40 -49.9 feet	No. of vessels	94	89	81	99	86	104
	Average	727,8	798,0	841,3	917,2	997,0	1134,0
50-59.9 feet	No. of vessels	35	37	32	34	29	31
	Average	1039,3	1105,0	1179,3	1385,0	1835,8	1682,4
60-69.9 feet	No. of vessels	13	13	12	5	8	6
	Average	1387,0	1500,0	1798,1	2274,0	2672,5	2470,4
70 feet and above	No. of vessels	1	-	-	-	2	-
	Average	*	-	-	-	*	-

- No observations

* Figures not available

[1] Typing error??Tr.

TABLE 5. BANKS FLEET

Average replacement value of vessel (hull, engine and equipment) in 1,000 Kroner (1978 values).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	No. of vessels	1	-	-	-	-	-
	Average	*	-	-	-	-	-
50 -59.9 feet	No. of vessels	-	-	-	-	-	-
	Average	-	-	-	-	-	-
60-69.9 feet	No. of vessels	4	5	2	3	1	4
	Average	1459,6	1463,6	*	2320,0	*	2844,4
70-79.9 feet	No. of vessels	14	19	11	6	5	6
	Average	2062,6	2090,8	3014,9	3430,0	4818,0	4298,0
80-89.9 feet	No. of vessels	6	6	7	7	4	7
	Average	2524,2	3094,3	4217,0	4745,7	5665,0	5474,1
90-99.9 feet	No. of vessels	7	9	8	16	16	16
	Average	3427,2	3891,9	5337,0	6100,6	6979,5	6884,0
100 feet and over	No. of vessels	6	4	5	6	9	10
	Average	3713,3	4099,0	6100,7	7153,3	7574,1	7722,7

- No observations

* Figures not available

TABLE 6. COALFISH SEINERS.

Average replacement value of vessel (hull, engine and equipment) in 1,000 Kroner (1978 values).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	No. of vessels	12	5	11	16	8	8
	Average	844,5	1016,4	1001,4	1048,1	1118,8	1286,8
50 -59.9 feet	No. of vessels	19	14	13	13	10	15
	Average	1117,4	1248,1	1501,2	1745,4	2105,0	1897,0
60-69.9 feet	No. of vessels	9	10	12	12	9	12
	Average	1387,3	1529,5	1977,1	2180,8	2995,4	2720,5
70 feet and over	No. of vessels	3	2	4	6	3	7
	Average	2965,0	*	3647,4	3988,3	5931,6	5696,0

- No observations

* Figures not available

TABLE 7. FRESH FISH TRAWLERS

Average replacement value of vessel (hull, engine and equipment) in 1,000 Kroner (1978 values).

		1975	1976	1977	1978	1979	1980
100-119.9 feet	No. of vessels	4	8	6	2	2	1
	Average	9622,4	9763,3	10221,1	*	*	*
120-139.9 feet	No. of vessels	14	15	10	11	10	9
	Average	12966,1	12847,5	12806,0	14905,9	14354,3	13455,1
140-159.9 feet	No. of vessels	17	31	17	20	29	31
	Average	14236,0	13598,3	13367,5	15934,0	15242,7	14366,9
160 feet and over	No. of vessels	1	1	-	1	1	1
	Average	*	*	-	*	*	*

- No obsrvations

* Figures not available

TABLE 8. SALTFISH TRAWLERS

Average replacement value of vessel (hull, engine and equipment) in 1,000 Kroner (1978 values).

		1975	1976	1977	1978	1979	1980
Under 140 feet	No. of vessels	-	-	-	-	1	-
	Average	-	-	-	-	*	-
140-159.9 feet	No. of vessels	-	-	2	2	3	3
	Average	-	-	*	*	15668,0	16360,0
160-179.9 feet	No. of vessels	-	-	2	-	3	3
	Average	-	-	*	-	16964,9	17282,7

- No obsrvations

* Figures not available

TABLE 9. FACTORY TRAWLERS

Average replacement value of vessel (hull, engine and equipment) in 1,000 Kroner (1978 values).

		1975	1976	1977	1978	1979	1980
Under 200 feet	No. of vessels	3	5	3	8	4	8
	Average	25133,7	25239,8	27443,5	26458,8	25496,4	24589,2
200 feet and over	No. of vessels	3	3	2	3	1	3
	Average	31099,9	29828,2	*	30710,0	*	28339,7

- No obsrvations

* Figures not available

TABLE 10. INDUSTRIAL TRAWLERS

Average replacement value of vessel (hull, engine and equipment) in 1,000 Kroner (1978 values).

		1975	1976	1977	1978	1979	1980
40-49.9[1]	No. of vessels	1	-	1	-	-	-
feet	Average	*	-	*	-	-	-
50 -59.9	No. of vessels	9	8	9	5	4	3
feet	Average	1171,4	1222,5	1584,1	1640,0	2278,8	1758,9
60-69.9	No. of vessels	26	19	17	14	7	6
feet	Average	1453,4	1556,6	2059,3	2207,9	2912,3	2631,8
70-79.9	No. of vessels	5	10	10	11	7	6
feet	Average	2274,5	2549,4	3323,1	3530,9	4410,8	4529,3
80-89.9	No. of vessels	12	12	7	7	6	4
feet	Average	3067,5	2884,1	3919,8	4567,1	5497,1	5451,5
90-99.9	No. of vessels	13	15	9	8	10	8
feet	Average	3571,5	3554,9	4828,1	5312,5	6404,3	6369,6
100-109.9	No. of vessels	5	8	7	6	7	8
feet	Average	4515,9	4291,6	5785,8	6603,3	7376,8	7309,8
110-119.9	No. of vessels	4	5	5	5	4	6
feet	Average	4878,9	4444,7	6985,1	8480,0	8680,5	8782,4
120 feet	No. of vessels	2	-	1	-	3	2
nd over	Average	*	-	*	-	11257,9	*

- No observations
* Figures not available

TABLE 11. PURSE SEINERS

Average replacement value of vessel (hull, engine and equipment) in 1,000 Kroner (1978 values).

		1975	1976	1977	1978	1979	1980
80-99.9 feet	No. of vessels	1	1	1	1	-	1
	Average	*	*	*	*	-	*
100-119.9 feet	No. of vessels	8	8	11	6	5	1
	Average	5258,6	5270,9	7642,9	8235,0	8915,4	*
120-139.9 feet	No. of vessels	29	31	24	32	20	18
	Average	7165,7	8437,3	11537,0	12717,5	12572,5	12285,4
140-159.9 and over	No. of vessels	23	17	19	27	30	26
	Average	9386,2	11028,4	14199,9	16392,2	16275,2	16050,8
160-179.9 and above	No. of vessels	6	14	8	12	13	13
	Average	12466,6	13855,1	17001,7	19631,7	18539,1	18497,7
180 feet and over	No. of vessels	4	5	3	4	2	3
	Average	14388,8	16469,4	17614,2	23292,5	*	19786,2

- No observations

* Figures not available

TABLE 12. COASTAL SHRIMP TRAWLERS

Average replacement value of vessel (hull, engine and equipment) in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
Under 40 feet	Number of vessels	1	-	-	-	-	5
	Average	*	-	-	-	-	790,9
40-49.9 feet	No. of vessels	51	60	63	53	52	67
	Average	717,5	808,5	874,4	940,4	998,4	1075,9
50-59.9 feet	No. of vessels	11	14	14	11	11	18
	Average	931,8	1077,9	1089,1	1310,0	1895,6	1642,6
60-69.9 feet	No. of vessels	-	2	1	1	2	4
	Average	-	*	*	*	*	2301,2

-No observations

* Figures not available

TABLE 13. OCEAN SHRIMP TRAWLERS

Average replacement value of vessel (hull, engine and equipment) in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
40-59.9 feet	Number of vessels	1	-	-	-	-	2
	Average	*	-	-	-	-	*
60-79.9 feet	No. of vessels	6	3	3	12	20	19
	Average	1734,9	2133,8	2726,0	2891,7	3910,1	3622,6
80-99.9 feet	No. of vessels	3	2	2	5	6	10
	Average	3183,8	*	*	5226,0	6864,3	6303,7
100-119.9 feet	No. of vessels	4	5	6	7	7	8
	Average	5606,0	4904,3	7346,1	8660,0	9495,2	9335,5
120-139.9 feet	Number of vessels	3	3	2	2	3	3
	Average	5230,4	8701,0	*	*	14239,9	14053,3
140-159.9 feet	No. of vessels	2	3	3	2	1	1
	Average	*	9298,4	14433,8	*	*	*

-No observations

* Figures not available

TABLE 14.

Average input of man-week per vessel in the Norwegian fishing fleet. (Empirical Standard Deviation in brackets)

	1975	1976	1977	1978	1979	1980
COSTAL FISHERIES	186 (67)	186 (66)	180 (58)	169 (52)	167 (59)	170 (60)
BANKS FISHERIES	338 (90)	351 (74)	358 (62)	375 (68)	407 (80)	416 (83)
COALFISH SEINING	254 (54)	247 (55)	264 (54)	237 (52)	258 (56)	276 (56)
FRESH FISH TRAWLING	602 (87)	436 (96)	483 (52)	537 (63)	525 (80)	383 (112)
SALT FISH TRAWLING	- ( )	- ( )	849 (119)	* ( )	806 (174)	694 (150)
FACTORY TRAWLING	1577 (83)	1260 (109)	1304 (148)	1357 (200)	1143 (188)	894 (165)
INDUSTRIAL TRAWLING	152 (46)	153 (37)	153 (46)	155 (43)	175 (59)	166 (52)
PURSE SEINING	391 (73)	399 (66)	368 (70)	394 (74)	360 (64)	323 (57)
COASTAL SHRIMP TRAWLING	79 (19)	84 (24)	83 (24)	83 (20)	85 (25)	83 (25)
OCEAN SHRIMP TRAWLING	305 (139)	378 (151)	387 (154)	300 (171)	278 (114)	281 (43)

-No observations

* Figures not available

TABLE 15. COASTAL FISHING FLEET

Average replacement value of vessels (hull, engine and equipment) per man-year in 1,000 NKr. (1978 prices).

		1975	1976	1977	1978	1979	1980
30-39.9 feet	Number of vessels	-	-	-	-	-	9
	Average	-	-	-	-	-	267,0
40-49.9 feet	No. of vessels	94	89	81	99	86	104
	Average	187,4	188,5	208,5	234,6	264,6	304,1
50-59.9 feet	No. of vessels	35	37	32	34	29	31
	Average	196,1	246,9	241,1	295,2	387,6	355,1
60-69.9 feet	No. of vessels	13	13	12	5	8	6
	Average	221,3	228,5	272,1	345,1	504,4	375,5
70 feet and over	Number of vessels	1	-	-	-	2	-
	Average	*	-	-	-	*	-

-No observations

* Figures not available

Table 16. BANK FLEET

Average replacement value of vessel (hull, engine and equipment) per man-year in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	1	-	-	-	-	-
	Average	*	-	-	-	-	-
50-59.9 feet	No. of vessels	-	-	-	-	-	-
	Average	-	-	-	-	-	-
60-69.9 feet	No. of vessels	4	5	2	3	1	4
	Average	250,6	181,1	*	346,6	*	504,4
70-79.9 feet	No. of vessels	14	19	11	6	5	6
	Average	359,1	236,4	332,7	394,6	579,2	476,2
80-89.9 feet	Number of vessels	6	6	7	7	4	7
	Average	254,1	316,2	413,0	460,7	588,6	574,0
90-99.9 feet	No. of vessels	7	9	8	16	16	16
	Average	321,1	367,9	493,0	578,6	638,3	618,4
100 feet and over	No. of vessels	6	4	5	6	9	10
	Average	350,7	378,2	621,2	650,5	667,5	691,3

-No observations

* Figures not available

TABLE 17. COALFISH SEINING

Average replacement value of vessel (hull, engine and equipment) per man-year in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	12	5	11	16	8	8
	Average	154,1	191,6	184,1	202,3	201,0	231,5
50-59.9 feet	No. of vessels	19	14	13	13	10	15
	Average	171,6	205,1	219,8	263,6	315,5	301,6
60-69.9 feet	No. of vessels	9	10	12	12	9	12
	Average	208,1	243,0	311,1	353,9	459,2	400,3
70 feet and over	No. of vessels	3	2	4	6	3	7
	Average	351,2	*	431,3	524,2	691,2	648,8

-No observations

* Figures not available

TABLE 18. FRESH FISH TRAWLERS

Average replacement value of vessel (hull, engine and equipment) per man-year in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
100-119.9 feet	Number of vessels	4	8	6	2	2	1
	Average	756,1	710,5	751,9	*	*	*
120-139.9 feet	No. of vessels	14	15	10	11	10	9
	Average	904,2	932,7	999,8	1149,5	1115,7	1048,9
140-159.9 feet	No. of vessels	17	31	17	20	29	31
	Average	1060,4	1001,1	1048,5	1209,2	1145,9	1059,5
160 feet and over	No. of vessels	1	1	-	1	1	1
	Average	*	*	-	*	*	*

-No observations

* Figures not available

TABLE 19 SALT FISH TRAWLERS

Average replacement value of vessel (hull, engine and equipment) per man-year in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
Under 140 feet	Number of vessels	-	-	-	-	1	-
	Average	-	-	-	-	*	-
140-159.9 feet	No. of vessels	-	-	2	2	3	3
	Average	-	-	*	*	769,6	831,0
160-179.9 feet	No. of vessels	-	-	2	-	3	3
	Average	-	-	*	-	755,5	753,7

-No observations

* Figures not available

TABLE 20. FACTORY TRAWLERS

Average replacement value of vessel (hull, engine and equipment) per man-year in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
Under 200 feet	Number of vessels	3	5	3	8	4	8
	Average	725,2	746,8	823,3	818,5	809,5	760,1
200 feet and over	No. of vessels	3	3	2	3	1	3
	Average	837,1	786,1	*	837,4	*	805,2

-No observations

* Figures not available

TABLE 21. INDUSTRIAL TRAWLERS

Average replacement value of vessel (hull, engine and equipment) per man-year in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	1	-	1	-	-	-
	Average	*	-	*	-	-	-
50-59.9 feet	No. of vessels	9	8	9	5	4	3
	Average	440,9	418,5	582,4	607,1	789,2	734,4
60-69.9 feet	No. of vessels	26	19	17	14	7	6
	Average	497,6	518,0	711,1	816,9	1123,8	971,3
70-79.9 feet	No. of vessels	5	10	10	11	7	6
	Average	653,7	691,7	1002,7	1076,3	1174,2	1189,3
80-89.9 feet	Number of vessels	12	12	7	7	6	4
	Average	727,5	743,9	1015,0	1172,5	1425,0	1435,7
90-99.9 feet	No. of vessels	13	15	9	8	10	8
	Average	767,3	850,7	1127,0	1302,7	1410,3	1406,3
100-109.9 feet	No. of vessels	5	8	7	6	7	8
	Average	878,4	918,4	1260,8	1459,9	1668,5	1690,3
110-119.9 feet	No. of vessels	4	5	5	5	4	6
	Average	944,2	912,4	1473,1	1713,5	1763,7	1807,2
120 feet and over	No. of vessels	2	-	1	-	3	2
	Average	*	-	*	-	1781,7	*

-No observations
* Figures not available

TABLE 22. PURSE SEINER

Average replacement value of vessel (hull, engine and equipment) per man-year in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
80-89.9 feet	No. of vessels	1	1	1	1	-	1
	Average	*	*	*	*	-	*
100-119.9 feet	No. of vessels	8	8	11	6	5	1
	Average	592,0	544,7	767,4	790,0	1088,2	*
120-139.9 feet	No. of vessels	29	31	24	32	20	18
	Average	691,7	762,9	1025,8	947,1	1210,3	1159,6
140-159.9 feet	No. of vessels	23	17	19	27	30	26
	Average	766,5	875,0	1145,5	1208,2	1380,6	1373,4
160-179.9 feet	Number of vessels	6	14	8	12	13	13
	Average	998,6	1063,9	1358,6	1356,0	1486,7	1461,6
180 feet and over	No. of vessels	4	5	3	4	2	3
	Average	1000,9	1227,6	1315,6	1754,5	*	1556,3

-No observations

* Figures not available

TABLE 23. COASTAL SHRIMP TRAWLERS

Average replacement value of vessel (hull, engine and equipment) per man-year in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
Under 40 feet	Number of vessels	1	-	-	-	-	5
	Average	*	-	-	-	-	419,5
40-49.9 feet	No. of vessels	51	60	63	53	52	67
	Average	380,0	428,8	479,3	513,0	574,2	613,1
50-59.9 feet	No. of vessels	11	14	14	11	11	18
	Average	446,0	473,3	522,4	606,8	886,9	747,1
60-69.9 feet	No. of vessels	-	2	1	1	2	4
	Average	-	*	*	*	*	1074,1

- No observations

* Figures not available

TABLE 24. OCEAN SHRIMP TRAWLERS.

Average replacement value of vessel (hull, engine and equipment) per man-year in 1,000 NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
40-59.9 feet	Number of vessels	1	-	-	-	-	2
	Average	*	-	-	-	-	*
60-79.9 feet	No. of vessels	6	3	3	12	20	19
	Average	373,2	361,7	445,8	630,3	732,3	755,0
80-99.9 feet	No. of vessels	3	2	2	5	6	10
	Average	415,1	*	*	848,4	1099,2	1002,5
100-119.9 feet	No. of vessels	4	5	6	7	7	8
	Average	591,0	518,3	781,3	943,5	1024,4	1029,1
120-139.9 feet	Number of vessels	3	3	2	2	3	3
	Average	520,1	681,5	*	*	1099,0	1038,0
140-159.9 feet	No. of vessels	2	3	3	2	1	1
	Average	*	650,4	933,3	*	*	*

-No observations

* Figures not available

TABLE 25. COASTAL FISHING FLEET

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
30-39.9 feet	Number of vessels	-	-	-	-	-	9
	Average	-	-	-	-	-	672
40-49.9 feet	No. of vessels	94	89	81	99	86	104
	Average	775	1037	1079	954	915	941
50-59.9 feet	No. of vessels	35	37	32	34	29	31
	Average	784	1069	1232	960	1056	1006
60-69.9 feet	No. of vessels	13	13	12	5	8	6
	Average	902	1539	1520	1218	969	1224
70 feet and over	Number of vessels	1	-	-	-	2	-
	Average	*	-	-	-	*	-

-No observations

* Figures not available

TABLE 26. BANKS FLEET

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	1	-	-	-	-	-
	Average	*	-	-	-	-	-
50-59.9 feet	No. of vessels	-	-	-	-	-	-
	Average	-	-	-	-	-	-
60-69.9 feet	No. of vessels	4	5	2	3	1	4
	Average	775	768	*	866	*	821
70-79.9 feet	No. of vessels	14	19	11	6	5	6
	Average	1647	1307	1538	1235	1445	1383
80-89 .9 feet	Number of vessels	6	6	7	7	4	7
	Average	1225	1306	1334	1105	1312	1307
90-99.9 feet	No. of vessels	7	9	8	16	16	16
	Average	1297	1232	1198	1387	1400	1501
100 feet and over	No. of vessels	6	4	5	6	9	10
	Average	1341	1292	1154	1171	1465	1771

- No observations

* Figures not available

TABLE 27. COALFISH SEINING

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	12	5	11	16	8	8
	Average	972	1680	1427	1467	1229	968
50-59.9 feet	No. of vessels	19	14	13	13	10	15
	Average	1057	1381	1541	1236	1452	757
60-69.9 feet	No. of vessels	9	10	12	12	9	12
	Average	1039	1374	1795	1550	1339	1298
70 feet and over	No. of vessels	3	2	4	6	3	7
	Average	2354	*	3246	2108	2554	1644

-No observations

* Figures not available

TABLE 28. FRESH FISH TRAWLING

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
100-119.9 feet	Number of vessels	4	8	6	2	2	1
	Average	2842	2469	2398	*	*	*
120-139.9 feet	No. of vessels	14	15	10	11	10	9
	Average	2948	3380	3334	2852	2786	3456
140-159.9 feet	No. of vessels	7	31	17	20	29	31
	Average	3404	3662	3077	2644	2496	3289
160 feet and over	No. of vessels	1	1	-	1	1	1
	Average	*	*	-	*	*	*

-No observations

* Figures not available

TABLE 29. SALT FISH TRAWLING

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
Under 140 feet	Number of vessels	-	-	-	-	1	-
	Average	-	-	-	-	*	-
140-159.9 feet	No. of vessels	-	-	2	2	3	3
	Average	-	-	*	*	1547	2716
160-179.9 feet	No. of vessels	-	-	2	-	3	3
	Average	-	-	*	-	1779	2767

-No observations

* Figures not available

TABLE 30. FACTORY TRAWLING

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
Under 200 feet	Number of vessels	3	5	3	8	4	8
	Average	1928	1693	1749	1574	1769	2222
200 feet and over	No. of vessels	3	3	2	3	1	3
	Average	2004	1954	*	1418	*	2210

-No observations

* Figures not available

TABLE 31. INDUSTRIAL TRAWLING

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	1	-	1	-	-	-
	Average	*	-	*	-	-	-
50-59.9 feet	No. of vessels	9	8	9	5	4	3
	Average	8768	8285	11150	8005	8847	11893
60-69.9 feet	No. of vessels	26	19	17	14	7	6
	Average	8814	9101	10335	9315	9856	10771
70-79.9 feet	No. of vessels	5	10	10	11	7	6
	Average	10265	12564	13325	12932	14130	16806
80-89.9 feet	Number of vessels	12	12	7	7	6	4
	Average	12917	12793	12333	13088	16107	19828
90-99.9 feet	No. of vessels	13	15	9	8	10	8
	Average	11381	12490	12485	14017	15408	19482
100-109.9 feet	No. of vessels	5	8	7	6	7	8
	Average	13077	15300	15512	13026	18138	21581
110-119.9 feet	No. of vessels	4	5	5	5	4	6
	Average	11606	14709	17538	14627	18370	23578
120 feet and over	No. of vessels	2	-	1	-	3	2
	Average	*	-	*	-	15715	*

-No observations

* Figures not available

TABLE 32. PURSE SEINING

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
80-99.9 feet	Number of vessels	1	1	1	1	-	1
	Average	*	*	*	*	-	*
100-119.9 feet	No. of vessels	8	8	11	6	5	1
	Average	10045	18913	19257	11579	13453	*
120-139.9 feet	No. of vessels	29	31	24	32	20	18
	Average	14045	20631	22566	14174	17784	20731
140-159.9 feet	No. of vessels	23	17	19	27	30	26
	Average	18643	28987	30165	20340	22501	25921
160-179.9 feet	Number of vessels	6	14	8	12	13	13
	Average	20837	34030	32694	23423	26319	27476
180 feet and over	No. of vessels	4	5	3	4	2	3
	Average	24189	36374	36522	23407	*	28054

-No observations

* Figures not available

TABLE 33. COASTAL SHRIMP TRAWLING

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
Under 40 feet	Number of vessels	1	-	-	-	-	5
	Average	*	-	-	-	-	270
40-49.9 feet	No. of vessels	51	60	63	53	52	67
	Average	248	395	363	382	337	435
50-59.9 feet	No. of vessels	11	14	14	11	11	18
	Average	257	328	250	390	404	439
60-69.9 feet	No. of vessels	-	2	1	1	2	4
	Average	-	*	*	*	*	535

-No observations

* Figures not available

TABLE 34. OCEAN SHRIMP TRAWLING

Catches per man-week, in kg.

		1975	1976	1977	1978	1979	1980
40-59.9	Number of vessels	1	-	-	-	-	2
feet	Average	*	-	-	-	-	*
60-79.9	No. of vessels	6	3	3	12	20	19
feet	Average	460	860	996	922	772	1048
80-99.9	No. of vessels	3	2	2	5	6	10
feet	Average	603	*	*	923	1028	1321
100-119.9	No. of vessels	4	5	6	7	7	8
feet	Average	762	1205	1070	949	1028	923
120-139.9	Number of vessels	3	3	2	2	3	3
feet	Average	762	1082	*	*	1605	1465
140-159.9	No. of vessels	2	3	3	2	1	1
feet	Average	*	1407	1698	*	*	*

-No observations

* Figures not available

TABLE 35. COASTAL FISHING FLEET

Processing value per man-week, in NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
30-39.9 feet	Number of vessels	-	-	-	-	-	9
	Average	-	-	-	-	-	2039
40-49.9 feet	No. of vessels	94	89	81	99	86	104
	Average	2298	3073	3293	2943	2684	2801
50-59.9 feet	No. of vessels	35	37	32	34	29	31
	Average	2281	3237	3704	2928	3143	2989
60-69.9 feet	No. of vessels	13	13	12	5	8	6
	Average	2563	4293	4497	3510	2796	3669
70 feet and over	Number of vessels	1	-	-	-	2	-
	Average	*	-	-	-	*	-

-No observations

* Figures not available

TABLE 36. BANKS FLEET

Processing value per man-week, in Nkr. (1978 values)

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	1	-	-	-	-	-
	Average	*	-	-	-	-	-
50-59.9 feet	No. of vessels	-	-	-	-	-	-
	Average	-	-	-	-	-	-
60-69.9 feet	No. of vessels	4	5	2	3	1	4
	Average	2932	3000	*	3253	*	2540
70-79.9 feet	No. of vessels	14	19	11	6	5	6
	Average	5935	4329	4953	3868	3838	4177
80-89.9 feet	Number of vessels	6	6	7	7	4	7
	Average	4363	4604	4709	4046	4555	4523
90-99.9 feet	No. of vessels	7	9	8	16	16	16
	Average	4517	4554	4438	5024	4996	5696
100 feet and over	No. of vessels	6	4	5	6	9	10
	Average	4478	4809	4155	4045	5108	6585

-No observations

* Figures not available

TABLE 37. COALFISH SEINING

Processing value per man-week, in NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	12	5	11	16	8	8
	Average	2058	3580	2923	3068	2537	1974
50-59.9 feet	No. of vessels	19	14	13	13	10	15
	Average	2263	2942	3278	2549	3048	1558
60-69.9 feet	No. of vessels	9	10	12	12	9	12
	Average	2046	2684	3588	3158	2693	2573
70 feet and over	No. of vessels	3	2	4	6	3	7
	Average	4897	*	7011	4296	5069	3223

-No observations

* Figures not available

TABLE 38. FRESH FISH TRAWLING

Processing value per man-week, in NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
100-119.9 feet	Number of vessels	4	8	6	2	2	1
	Average	7393	6197	5698	*	*	*
120-139.9 feet	No. of vessels	14	15	10	11	10	9
	Average	7644	8601	7881	6753	6567	8898
140-159.9 feet	No. of vessels	17	31	17	20	29	31
	Average	9033	9371	7278	6050	5888	8295
160 feet and over	No. of vessels	1	1	-	1	1	1
	Average	*	*	-	*	*	*

-No observations

* Figures not available

TABLE 39. SALT FISH TRAWLING

Processing value per man-week, in NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
Under 140 feet	Number of vessels	-	-	-	-	1	-
	Average	-	-	-	-	*	-
140-159.9 feet	No. of vessels	-	-	2	2	3	3
	Average	-	-	*	*	5455	10612
160-179.9 feet	No. of vessels	-	-	2	-	3	3
	Average	-	-	*	-	6474	10971

-No observations

* Figures not available

TABLE 40. FACTORY TRAWLING

Processing value per man-week, in NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
Under 200 feet	Number of vessels	3	3	3	8	4	8
	Average	10356	8940	9355	7961	9073	11999
200 feet and over	No. of vessels	3	5	2	3	1	3
	Average	10640	10201	*	6855	*	11791

- No observations

* Figures not available

TABLE 41. INDUSTRIAL TRAWLING

Processing value per man-week, in NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	1	-	1	-	-	-
	Average	*	-	*	-	-	-
50-59.9 feet	No. of vessels	9	8	9	5	4	3
	Average	3246	3022	4143	2895	3265	4591
60-69.9 feet	No. of vessels	26	19	17	14	7	6
	Average	3075	3196	3764	3312	3595	3979
70-79.9 feet	No. of vessels	5	10	10	11	7	6
	Average	3535	4448	4718	4519	3050	6322
80-89.9 feet	Number of vessels	12	12	7	7	6	4
	Average	4355	4390	4269	4579	5699	7392
90-99.9 feet	No. of vessels	13	15	9	8	10	8
	Average	3896	4275	4332	4689	5373	7142
100-109.9 feet	No. of vessels	5	8	7	6	7	8
	Average	4296	5353	5407	4359	6359	8085
110-119.9 feet	No. of vessels	4	5	5	5	4	6
	Average	3737	4922	5981	4993	6478	8698
120 feet and over	No. of vessels	2	-	1	-	3	2
	Average	*	-	*	-	5321	*

-No observations
* Figures not available

TABLE 42. PURSE SEINING

Processing value per man-week, in NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
80-99.9 feet	Number of vessels	1	1	1	1	-	1
	Average	*	*	*	*	-	*
100-119.9 feet	No. of vessels	8	8	11	6	5	1
	Average	3812	7958	7936	4470	5329	*
120-139.9 feet	No. of vessels	29	31	24	32	20	18
	Average	5573	8639	9322	5488	7208	8669
140-159.9 feet	No. of vessels	23	17	19	27	30	26
	Average	7476	12087	12657	8023	8867	10684
160-179.9 feet	Number of vessels	6	14	8	12	13	13
	Average	8393	14430	13587	9186	10608	11356
180 feet and over	No. of vessels	4	5	3	4	2	3
	Average	9803	15397	15043	9003	*	11681

-No observations

* Figures not available

TABLE 43. COASTAL SHRIMP TRAWLING

Processing value per man-week, in NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
Under 40 feet	Number of vessels	1	-	-	-	-	5
	Average	*	-	-	-	-	1636
40-49.9 feet	No. of vessels	51	60	63	53	52	67
	Average	1574	2743	2594	2611	2939	3686
50-59.9 feet	No. of vessels	11	14	14	11	11	18
	Average	1645	3170	2717	2723	3377	3779
60-69.9 feet	No. of vessels	-	2	1	1	2	4
	Average	-	*	*	*	*	5698

-No observations

* Figures not available

TABLE 44. OCEAN SHRIMP TRAWLING

Processing value per man-week, in NKr. (1978 values).

		1975	1976	1977	1978	1979	1980
40-59.9 feet	Number of vessels	1	-	-	-	-	2
	Average	*	-	-	-	-	*
60-79.9 feet	No. of vessels	6	3	3	12	20	19
	Average	3075	6702	6246	5094	4132	6273
80-99.9 feet	No. of vessels	3	2	2	5	6	10
	Average	4122	*	*	4905	5549	7745
100-119.9 feet	No. of vessels	4	5	6	7	7	8
	Average	4322	8055	6414	5932	7064	6920
120-139.9 feet	Number of vessels	3	3	2	2	3	3
	Average	4099	6711	*	*	12977	14035
140-159.9 feet	No. of vessels	2	3	3	2	1	1
	Average	*	8800	9931	*	*	*

- No observations

* Figures not available

TABLE 45. COASTAL FISHING TRAWLING

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
30-39.9 feet	Number of vessels	-	-	-	-	-	9
	Average	-	-	-	-	-	101
40-49.9 feet	No. of vessels	94	89	81	99	86	104
	Average	179	220	211	163	144	132
50-59.9 feet	No. of vessels	35	37	32	34	29	31
	Average	159	189	212	132	106	121
60-69.9 feet	No. of vessels	13	13	12	5	8	6
	Average	159	268	190	123	82	122
70 feet and over	Number of vessels	1	-	-	-	2	-
	Average	*	-	-	-	*	-

-No observations

* Figures not available

TABLE 46. BANKS FLEET

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	1	-	-	-	-	-
	Average	*	-	-	-	-	-
50-59.9 feet	No. of vessels	-	-	-	-	-	-
	Average	-	-	-	-	-	-
60-69.9 feet	No. of vessels	4	5	2	3	1	4
	Average	125	157	*	99	*	84
70-79.9 feet	No. of vessels	14	19	11	6	5	6
	Average	181	194	160	111	94	120
80-89.9 feet	Number of vessels	6	6	7	7	4	7
	Average	167	158	117	85	78	95
90-99.9 feet	No. of vessels	7	9	8	16	16	16
	Average	158	133	93	91	88	99
100 feet and over	No. of vessels	6	4	5	6	9	10
	Average	136	132	67	69	86	104

- No observations

* Figures not available

TABLE 47. COALFISH SEINING

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	12	5	11	16	8	8
	Average	264	356	316	282	242	174
50-59.9 feet	No. of vessels	19	14	13	13	10	15
	Average	243	266	293	190	172	107
60-69.9 feet	No. of vessels	9	10	12	12	9	12
	Average	197	228	234	167	123	137
70 feet and over	No. of vessels	3	2	4	6	3	7
	Average	254	*	288	139	152	97

- No observations

* Figures not available

TABLE 48. FRESH FISH TRAWLING

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
100-119.9 feet	Number of vessels	4	8	6	2	2	1
	Average	171	122	126	*	*	*
120-139.9 feet	No. of vessels	14	15	10	11	10	9
	Average	138	112	121	100	98	89
140-159.9 feet	No. of vessels	17	31	17	20	29	31
	Average	139	111	110	90	86	88
160 feet and over	No. of vessels	1	1	-	1	1	1
	Average	*	*	-	*	*	*

- No observations

* Figures not available

TABLE 49. SALT FISH TRAWLING

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
Under 140 feet	Number of vessels	-	-	-	-	1	-
	Average	-	-	-	-	*	-
140-159.9 feet	No. of vessels	-	-	2	*	3	3
	Average	-	-	*	*	78	100
160-179.9 feet	No. of vessels	-	-	2	*	3	3
	Average	-	-	*	*	96	126

-No observations

* Figures not available

TABLE 50. FACTORY TRAWLING

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
Under 200 feet	Number of vessels	3	5	3	8	4	8
	Average	121	89	79	77	79	78
200feet and over	No. of vessels	3	3	2	3	1	3
	Average	101	76	*	68	*	70

-No observations

* Figures not available

TABLE 51. INDUSTRIAL TRAWLING

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
40-49.9 feet	Number of vessels	1	-	1	-	-	-
	Average	*	-	*	-	-	-
50-59.9 feet	No. of vessels	9	8	9	5	4	3
	Average	846	895	795	536	505	578
60-69.9 feet	No. of vessels	26	19	17	14	7	6
	Average	722	735	617	527	409	477
70-79.9 feet	No. of vessels	5	10	10	11	7	6
	Average	600	717	698	533	540	585
80-89.9 feet	Number of vessels	12	12	7	7	6	4
	Average	672	619	516	490	471	544
90-99.9 feet	No. of vessels	13	15	9	8	10	8
	Average	588	608	491	438	462	572
100-109.9 feet	No. of vessels	5	8	7	6	7	8
	Average	613	687	525	377	442	515
110-119.9 feet	No. of vessels	4	5	5	5	4	6
	Average	511	596	451	353	408	520
120 feet and over	No. of vessels	2	-	1	-	3	2
	Average	*	-	*	-	412	*

-No observations

* Figures not available

TABLE 52. PURSE SEINING

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
80-99.9 feet	Number of vessels	1	1	1	1	-	1
	Average	*	*	*	*	-	*
100-119.9 feet	No. of vessels	8	8	11	6	5	1
	Average	616	1156	732	443	409	*
120-139.9 feet	No. of vessels	29	31	24	32	20	18
	Average	715	937	694	410	464	483
140-159.9 feet	No. of vessels	23	17	19	27	30	26
	Average	833	1097	823	502	521	520
160-179.9 feet	Number of vessels	6	14	8	12	13	13
	Average	734	1084	821	507	541	541
180 feet and over	No. of vessels	4	5	3	4	2	3
	Average	853	1086	1000	511	*	445

-No observations

* Figures not available

TABLE 53. COASTAL SHRIMP TRAWLING

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
Under 40 feet	Number of vessels	1	-	-	-	-	5
	Average	*	-	-	-	-	23
40-49.9 feet	No. of vessels	51	60	63	53	52	67
	Average	27	34	31	27	27	32
50-59.9 feet	No. of vessels	11	14	14	11	11	18
	Average	23	35	27	25	20	25
60-69.9 feet	No. of vessels	-	2	1	1	2	4
	Average	-	*	*	*	*	23

-No observations

* Figures not available

TABLE 54. OCEAN SHRIMP TRAWLING.

Catches (kg) per 1,000 - 1978 NKr. in replacement value of vessel and equipment (not including value of gear).

		1975	1976	1977	1978	1979	1980
40-59.9 feet	Number of vessels	1	-	-	-	-	2
	Average	*	-	-	-	-	*
60-79.9 feet	No. of vessels	6	3	3	12	20	19
	Average	46	106	83	61	45	61
80-99.9 feet	No. of vessels	3	2	2	5	6	10
	Average	56	*	*	40	39	52
100-119.9 feet	No. of vessels	4	5	6	7	7	8
	Average	48	88	53	39	33	34
120-139.9 feet	Number of vessels	3	3	2	2	3	3
	Average	57	53	*	*	65	64
140-159.9 feet	No. of vessels	2	3	3	2	1	1
	Average	*	97	67	*	*	*

-No observations

* Figures not available